"HUMAN RESOURCES DEVELOPMENT IN SUDANESE BUILDING INDUSTRY"
(A Descriptive Qualitative Research Model)

A thesis submitted to the
Graduate College
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Department of Architecture

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First and foremost, to the memory of my lovely parents for their love and encouragement throughout my life and career, and to my wife Elham and my lovely sons and daughters Saad, Samar, Sara, Sally and Ahmed.

To my lovely sisters who supported me a lot and special dedication to the soul of my sister Samia.

To Dr. Elwasila Guddoura, my brother in law, whom support and sacrifice, particularly during my early life, will always be remembered.

I am also, dedicating this work to all those people who support and sacrifice me during the writing and development of these thesis.
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This research investigates the importance of Human Resource development (HRD) in the construction industry, particularly at the project execution level. The study includes an appraisal of the workforce's jobs, which seems important for understanding development objectives and for evaluating the effectiveness of current development practice. Several research methods have been used, including research and unstructured interviews with academic staff, and structured surveys of the Sudanese building firms (both consultants and contractors) as well as the workforce employed and/or self-employed in the local market. The research findings are compared with results obtained from other studies, and are evaluated within a framework of concepts, ideas, and models drawn from modern management theories and thought. The study lends support to the ideas that construction management is specific to the situation, as Mullins (1999) says "A key feature of the study of management and organizational behavior is that it is difficult to identify a single solution to a particular problem", so that the work and development of human resources and management cannot be considered without reference to numerous variables. The research indicates that construction workforces operate in poorly-defined project's roles and tasks, and that they rely heavily on interpersonal decision and problem handling skills derived from their experience. Training and development of human resources improve efficiency, effectiveness, and competence, but will not make their best contribution unless certain conditions are met, such as HR policies, HR strategy, etc.

Two particular contributions targeted the study of the human resources development. Firstly, an attempt to achieve a high level of "integration" of concepts regarding the purpose, methods, and content of human resource management in the Building Industry: - for the purpose of research a conceptual framework which is comprehensive, yet practical and relevant. Secondly, definite concepts such as "differentiation" of the practitioner's role are developed along a number of dimensions.

The study suggests that organizations should acknowledge training as a mainstream activity for a main resources development, should give more attention to the strategic aspects of development to create a better "learning organization".
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Chapter 1: Identifying the Problem

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CHAPTER 1

IDENTIFYING THE PROBLEM

1.1 General Introduction

The construction industry is one of the largest global employment sectors, providing work for a significant proportion of the labour and accounting for a significant share of the world Gross Domestic Product (GDP). The industry also represents one of the most risky, complex and manual labour supported by a management framework which has to coordinate many professional, construction and supplier organizations whose sporadic involvement will change through the course of a project.

The fragmentation and dynamism of this process and the need to integrate a wide range of occupational cultures render construction one of the most complex project-based industries. The complexity of many current construction projects requires a redirection and focusing of process to attend various aspects of performance, also, the need for careful evaluation of the entire education and training process. There are many individual perspectives on the concept of proper training for various positions within the construction process, but the study agree on the requirement to develop and encourage the development of certain abilities so that each individual can perform at the peak of its own capability.

".. in assessing the impact of training and development is the widely held view that training and development needs to be considered together with other human resources management policies, and that the combined impact of a "bundle" of HR policies is greater than the sum of individual policies on their own." (Huselid, 1995; MacDuffie, 1995, Ichniowski, 1995)

Also, Green F. (1997) reported that:

"There are, however, no formal studies of the impact of training and development on profitability. Instead there are studies which focus on "intermediate" variables that is, organization-wide variables that are important in the determinates of profit"

Thus, an appropriate definition of HRM could be:

"A managerial perspective, with theoretical and perspective dimensions, which argues for the need to establish an integral series of personal policies consistent with organization strategy, thus ensuring quality of working life, high commitment and performance from employees, and organizational effectiveness and competitive advantage." (Huczynski and Buchanan, 2001: 673)

Text on organizational behaviour and management explains the central role of the HRM function to organizational performance. However, few texts have considered the specific context and challenges that project-based industries present and few more have
sought to capture effective approaches to define HRM function within the construction sector, or to examine how these activities could be adapted and implemented in a way which improves the performance and job satisfaction of the industry’s workforce.

Mullins (1999) argued that:

"People are individuals who bring their own perspectives, value, and attributes to organizational life, and, when managed effectively, these human traits can bring considerable benefits to organizations"

The development of modern theories concerning Human Resources Development (HRD) has been punctuated by different schools of thought, which explain the existence, purposes and functioning of organizations in different ways. This range of theories is often difficult to reconcile; and general management thought remains a constantly changing cocktail of different ideas many of which provide a unique view of individual case and their problems.

As a result, it would be counter-productive for managers to attach themselves to one organizational theory in the belief that it can solve all their problems. It is more appropriate to develop an understanding of them all, within the social, economic and political context in which they are developed. This enables managers to assess their value in a highly dynamic world.

1.2 Summary and Classification of Human Resource Management (HRM) Definitions

A summary classification of the concepts of HRM definitions reviewed in the study is given in the following categories. Few concepts can be subject to as many different definitions and interpretation as the term HRM.

1) HRM as Managerial Development Aspects

- "aimed at meeting management's human resources needed." (Loosemore et al., 2003),
- "... HRM emphasizes the development of the management team." (Legg, 1989),
- "HRM as a process which aligns the needs of the organization and those of the employee..." (Storey, 1993),
- "A managerial perspective, with theoretical and perspective dimension..." (Huczynski et al., 2001),
- "..with managerial responsibility to be involved with employees’ management issues." (Cornelius, 2001),

2) HRM as Employee Resourcing Aspects

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- "Forecasting and selecting the type of employee in order to achieve specific objectives" (Atkinson, 1985),
- ".. deployed as effectively as possible to the achievement of goals." (Torrington, 1991)

3) HRM as Development and Training Aspects

- "..HRD represents the development side of the HRM function in assessing and improving individual performance." (Loosemore, 2003),
- "..provides the foundation of individuals' employability,... gives them the means to maintain it..." (ILO's report, 1998),
- "..retains a job, improves their productivity at work, and their income earning..." (ILO's report, 1998)
- "Better quality is often quoted as a benefit of improved training method..." (De Simon, 1966, ed. Shaddad, 1983),
- "Training can reduce waste, and increases output..." (Glueck, 1974, ed. Shaddad, 1983),
- "..reduces accidents, increase output, reduce maintenance, and improves quality." (Levitt et al., 1976, ed. Shaddad, 1983),
- "..Dissatisfaction, complaints, absenteeism and turnover can be reduced..." (Pigores et al., 1969, ed. Shaddad, 1983),
- "..motivates employees to work hard..." (Strauss et al., 1960, ed. Shaddad, 1983),
- "..quality on construction sites is largely determined by the ability and resourcefulness of operatives." (Bentley et al., 1981, ed. Shaddad, 1983),
- "..training can also affect the demand of supervision, improve performance of gang which is affected by work of a trainee, improve the degree of flexibility or adaptability of the workforce, and improve information processing and communication"; (Loosemore, 2003),
- "..reduces learning (cycle) time; this is almost the traditional result of improved training methods." (King et al., 1964, ed. Shaddad, 1983).

4) HRD as Behaviour Aspects

- ".. improves an individual's ability to perform job..." (Dunn et al., 1972),
- "..training can be viewed...change in the behavioral of the trainee in the form of increased ability to perform the job..." (Dunn et al., 1972),
- "..training provides knowledge and skills required to perform job..." (Dunn et al., 1972),
- "..provides its members within the necessary skills to meet current and future job demands." (Harris, 1994),
- "Several training and recruitment strategies... to achieve a sufficient supply of skilled site labour in the future." (Agapiou, 1995a),

-3-
- “The object of training is to alter permanently the behaviour of employees ... will bring improvements in the achievement of organizational goals.” (Loosemore, 2003),
- "It should provide opportunities for an employee to learn-job-related skills, attitudes, and knowledge." (Loosemore, 2003),

5) HRD as a Performance and Productivity Aspects
- "...the improvement of recruitment is the key to improving performance in the industry..." (Drucker et al., 1995a),
- "...contribute to improved productivity." (Drucker, 1981),
- "attaining, maintaining and improving performance... that what is training about," (Brech, 1971),
- "Craft skill development has been seen as a direct means of increasing productivity of the labor-intensive industry." (Hatchett, 1982),
- "...no career-development policy... to insure the efficient and effective use of the resources." (Young, 1988),
- "...HRD contributes to improved productivity...by improving the quality of work life for employers." (Keep et al., 2000),
- "...training is still a fundamental requirement for improving organizational performance and filling skills gap. “(Drucker et al., 1996),
- "the importance of employee training and development in enabling organizations to survive in the face of 'new industrial world' created by forces such as globalization, the increasing power of the customer, dramatic social and environmental changes, and the growth of e-business." (Dufficy, 2001),
- "...where those industries which invest in training tend to perform better and have a more positive public image than those which do not.” (Martin et al., 2003),
- "...the overall goal of the global economy...four strategic objectives that are vital to social progress: employment creation, supported by increased and effective investment in human resources development, learning and training for employability, competitiveness, growth and social inclusion of all, promoting human rights at work, improving social protection; and promoting social dialogue." (ILO, 1989, p. 21),
- "...impact on their competitiveness and ability to profit from their commercial environment." (Anthony et al., 1996: 3).

1.3 Scope and Aims of Study

The study is designed to identify appropriate methods of evaluating training and development of managing workforce at the project level which accord with wider organizational and social objectives. The aims are to show the case elements of good
practice, but also to cast a critical eye on existing HRM practices, and to identify how these could be managed more effectively. Project and business performance can be improved through the effective management of workforce. The study aims also to address this issue by providing an informative exploration into how modern construction organizations manage the various aspects of Human Resource Management (HRM). As well as holding up a mirror to current practice, it also cast a critical approach to managing labour in the industry. The study attempted to identify new and alternative strategies for managing labour that enable managers and organizations to survive the increasingly competitive and volatile construction industry labour market:

"There are countless examples of corporate and project crises in the construction sector which have arisen as the result of people’s behaviour, and it would seem that human resource management (HRM) has the potential to eliminate more construction risks than any other management approach" (Loosemore, 2000).

Unfortunately, the Sudanese construction industry is the least developed in terms of mechanization, productivity and the benefit derived from industrial progress. Comparing HRM practices in the Sudanese Building Industry to those in developing countries indicate that Sudan needs to adopt a more structured approach, including formal training and proper grading of skilled labour force.

The thesis presents a case study of Sudanese Building Industry aimed at meeting the above challenges with the following hypotheses:

1- Define a training and development of workforce system to increase performance of the project,
2- Changes in the behaviour (knowledge, attitude, ability and skill) of workforce to increase the productivity of the project,
3- Improve the performance of the Sudanese construction industry via training and development of workforce,
4- Define effective use of skill training to achieve efficiency, effectiveness and competence,
5- Examine the link between skill formation and performance of the project.

To achieve such hypotheses, the study critically examines the essential feature of a conceptual framework that determines the productivity of organization-behaviour science. Modification of the model and selection of the essential variables which will guide the study to the end-result (productivity, effectiveness, and efficiency) will also affect the important end variable, and the performance of the project (time, cost, quality).
A conceptual difficulty arose in deciding how to model the research findings and this had implications for the objectives of the study. A causal model modified from a primary conceptual framework of the determinates of productivity in Organization-Behaviour Science approach, summarized the characteristic activities for developing human resources and whether such activities were effective, would be interesting and unlikely lead to much improvement. So, the main objective of this study is to explore the system performance of the project (Time, Cost and Quality), with the intention of identifying the major project managerial factors that determine or strongly influence the system performance and establish the basic interaction of these variables in a conceptual model. Such a model, if developed, would aid and conceptualize the understanding of the problem of training and development which will affect the performance of the construction at execution of the project. Therefore, the primary objectives of the thesis are to specify the relative importance of proper managing of the human resource in the construction industry. The ability to attract, retain, and develop talented labour force is a key feature of successful business. A labour force is an organization's most valuable asset, and this is especially true in relatively low-tech, labour-intensive industries such as construction. However, labour force also represents the most difficult resource for organizations to manage. The study, also attempts to maintain a balance between theory and practice. This is done by drawing upon a mainstream organizational behaviour and HRM theory and by exploring its application within the unique context that the industry presents.

To study training and development of labour in the Sudanese building industry, the following variables must first be studied:

Socio- Economic factor, level of construction skills, availability of training programme, benefits gained from providing training, official and international organization objectives of training programmes, government policies in providing training, and reviewing the education facilities in Sudan. The study encourages the development of certain individual's abilities that allows each to perform upon his/her own capabilities.

At the end, an assessment can be drawn from the opinions of the practitioners (well selected local and international construction companies) of the different variables of the model and their inter-relationships, thus establishing a set of weighting factors to examine the casual assumptions inherent in the model.
1.4  Methodology

Some controversy surrounds the methodology of the social sciences. Some scholars deny that scientific study of society is desirable or even possible. However, writers such as Potter (1975) argue that social scientists try to explain what are they studying, but speak of trends and tendencies rather than inevitabilities and absolutes. They classify, use models, construct hypotheses, and build theories that provide reasonable explanations of social phenomena. This research made the firm assumption that the processes of management and human resource development can be subjected to "systematic" study, within certain limits which are fairly well understood. Whereas classical approaches emphasized the technical requirements of the organization, excluding the people working within it, and the human relations approaches emphasized human psychological and social aspects of work, excluding the organizations, the system approaches attempts to reconcile both approaches by addressing the interrelationships of structure and behaviour (Mullins 1999). This research seeks to discover regularity and order, and offer explanation of the behaviour and attitudes being studied. The formulation of explanations does, however, present a special strain for social investigations of a broad, integrative nature, like this research. Handy (1976) records an early disappointment when, anticipating that he would find laws governing the behaviour of people and organizations, he found only "concepts and ideas abounding... ponderous confirmation of the obvious... and the most exciting ideas did not always work."

This study took the view that theories are seldom confirmed, but they may become more acceptable as evidence supporting them accumulates. Theories may be modified and improved by successive iterations of deductive and empirical activities. However, to accomplish the basic objectives of this thesis, three stages of the research programme have been identified:

a) a review of the literature concerned with:
   i) human resource management,
   ii) performance of the construction project at the execution level,

b) an examination of the existing literature to formulate a conceptual schematic model, which attempts to explain the casual inter-relationships between the defined managerial activities with training and development and hence system performance of the project at the execution level,
c) an assessment of the opinions of the practitioners (the selected construction companies) of the different variables of the model and their inter-relationships, thus establishing a set of weighting factors to examine the casual assumptions inherent in the model.

1.5 Concluding Remarks

The importance of this study can be seen in different ways. The study focuses at the project level of the construction process, and is designed to assist managers of construction projects to manage the HRM function effectively. The second unique feature of the study is the link it draws between HRM and organizational performance. It is the key to positioning HRM at the center of the construction debate and thereby to release the significant untapped productive potential of the industry’s workforce.

The study raises many topics, enlivened by numerous case studies, which provide practical examples of the best practice around the world—particularly in Asia, Australia, United States of America and Europe. As the construction industry becomes truly global, the need to understand and compare practices, performances and standards in different countries, since the practices of HRM is not yet well developed in the Sudanese Construction Industry as in other developing countries.

1.6 The Organization of the Study

The thesis in the first chapter identifies the problem facing training and development in the construction industry, the aims and the methodology of the study. In the second chapter, the thesis tackles the role of the building industry in the economy of a state, and states the problems facing the industry bearing in mind the quickening pace of globalization and technological changes. The third chapter tackles the theoretical and conceptual considerations, leaving chapters 4, 5, 6, and 7 for the treatment of the seven subsystems in Fig. 8 with references for human resources development principles in chapter 4, with special consideration of training and development concepts at all levels of organizations (the chapter will include training process and types). Chapter 8 attempts to assess the effectiveness, efficiency, and competence as important factors of the project. Chapter 9 tackles the integration of the conceptual causal model, leaving chapter 10 for predicating and testing the conceptual causal model. Chapter 11 and 12 deals with the conclusions and recommendations required for the adoption of human resources management principles, and to develop training policies and practice at the state level.
Chapter 2: The Construction Industry

2.1 Introduction
2.2 Definition of Construction Industry
2.3 Construction Industry: its Role and its Significance in a Nation's Development
2.4 The Importance of the Construction Industry
2.5 The Building Industry: Characteristic of the Construction Process and the Main Problems Facing the Industry
2.6 The Nature of the Construction Industry
2.7 The Place of Construction in the National Economy
2.8 The Variable Demand for Construction Products and Service
2.9 The Organization of Construction Work
2.10 Problems Facing the Construction Industry in the Developing Countries
2.11 Construction Industry as Employer
2.12 The Labour Market and the Image of the Construction Industry
2.13 Self-Employment in the Construction Industry
2.14 The Impact of Change in the Construction Environment
CHAPTER 2

THE CONSTRUCTION INDUSTRY

2.1 Introduction

Construction is one of the major industries in the global world—it is the creator of the built environment within which most other economic activities take place. Providing work for a significant proportion of the labour market and accounting for a significant share of the world Gross Domestic Product (GDP). Buildings and other construction products have a pervasive influence on social activity in modern society. The built environment of a society expresses its cultural values, and is a major influence on the visual beauty or squalor people experience. However, houses, roads, factories, offices, schools, hospitals are also part of complex physical infrastructure of daily life.

The hard, physical nature of much construction work, often undertaken in a poor working environment, its frequent combined with images of masculine stereotypes to create impressions of what construction work is like. At best a half-truth, the idea of ‘hard men’ dashing around construction sites with devil-may-care attitudes in attempts to make the most out of piece rates and bonuses may be used as part explanation of poor site safety, the young age profile of the workforce, and low-quality work. From this perspective, management may be said to do its best to contain the worst excesses, and is conveniently absolved of responsibility for their causes.

Few manual workers now do the traditional labouring jobs associated with construction; over the past thirty years machines have taken over many of the heavy digging and lifting tasks. In United Kingdom, roughly 70% of private-sector building workers are classified as having some sort of skill, according to Construction Industry Training Board (CITB) returns. ‘Skill’ is a social construct denoting status, earning capacity, industrial power and the ability to exclude others, as well as indicating a capacity of certain specified tasks.

2.2 Definition of Construction Industry

Most definitions describe the construction process and features of the industry’s product as merely indications of what the construction industry includes or does not include. For instance, Colean et al. (1982), Lange et al. (1979), view construction as an aggregate of business engaged in closely related activities. Nam et al. (1989) suggest that,
historically, construction refers to all types of activities associated with the erection and repair of immobile structure and facilities. The United States Department of Commerce (1984) defines construction by considering the immobility of its products.

Hillebrandt (1984) defines construction process as covering the parties involved in the construction processes and, to some extent, the suppliers of the industry’s inputs. In the review of statistics on the construction in the United Kingdom “construction” was interpreted to mean resources directly used in construction, the products of construction activity, and financial and operational aspects of the building materials and construction industries.

Considering the participants in the construction process, the various definitions appear to portray the industry as a series of related but discrete activities, persons, or organizations as shown in Fig. 1.
The construction industry is often defined in terms of the activities and products that are included in, or excluded from it.

Fig. 1 The Construction Industry (Offori G., 1990, p.20)
The international Standard Industrial Classification of all Economic Activities (1968, pp. 35-36) defines construction as follows:

"...Constructing, altering, repairing and demolishing building; constructing, altering and repairing highways and streets and bridges, ...and other types of heavy construction...mining services such as preparing and constructing mining sites and drilling crude oil and natural gas wells...specialist trade contractors'...activities...

"The assembly and installation on site of prefabricated, integral parts into bridges, water tanks, storage and warehouse facilities,...Departments or other units of the manufactures of the fabricated parts and equipment which specialize in this work and which it is feasible to treat as separate establishments, as well as business primarily engaged in the activity, are classified in this group.

Offori (1990, pp.23-24) suggest a broad definition that reads:

"The industry may be defined as that sector of the economy which plans, designs, constructs, alters, maintains, repairs and eventually demolishes buildings of all kinds, civil engineering work, mechanical and electrical engineering structures and other similar works."

Thus, the industry includes:

a) Persons, enterprises and agencies, both public and private, involved in physical construction; those whose main activity is construction and the relevant parts of entities engaged in other fields of activity who retain some construction capacity (such as the maintenance units of an university or a manufacturing enterprise); and

b) Those providing all kinds of planning, design, supervisory, and managerial services relating to construction.

By this definition, the construction industry embraces enterprises engaged in the actual physical work on new or existing buildings, as well as civil, mechanical and electrical engineering works. It also involves the utilization of human and economic resources in the conception, design, maintenance, or demolition of buildings and civil engineering’s works. But this definition can only be used as a general statement about construction, which may be considered as one industry only to the extent that the services given and the technology employed are similar through various building types. There is not one industry but many sub-industries, which may be regarded as coming under the umbrella of the main industry concept. If our definition of the construction industry is that it consists of the building and the civil engineering companies and organizations which put up buildings and construct dams and roads and bridges, then it is quite obvious that this reshaping of capital (to conform better to the requirements of the present phase of the internalization of production, of the division of labour, of the shape of the materials and
labour resources and the technology practice.) must affect these companies and organization in terms of investment input, size, location and natural markets, and the availability and technological content of output.

### 2.3 Construction Industry: Its Role and its Significance in a Nation's Development

The construction industry accounts for a sizeable proportion of worldwide economic activity. In Europe, it accounts for some 10% of Gross Domestic Product (GDP), and in Australia it employs about 8% of the nation's workforce (Proverbs et al., 1999). Productivity and profitability increases within construction would therefore have substantial benefits to the broader economy. Stoeckel et al. (1990) reported that if the construction industry increased its effectiveness by 10% this could lead to an increase of up to 2.5% in GDP. As well, construction is one of the sectors of the economy covered by the quarterly and annual statements of national accounts. Toh (1988) observed that construction industry is unique among the sectors of the economy in that it appears twice in the national accounts: under GDP and also under Gross Fixed Capital Formation (GFCF). It reported in national accounts the value at market prices of fixed capital formation in construction, which, together with transport, machinery and other equipment, is a component of fixed capital formation. Turin (1973), showed that the mean value of fixed capital formation in construction as a percentage of GFCF are comprised in 45%-60% range.

Despite recent advances in technology, production management techniques, construction remains one of the most people-reliant industrial sectors. Human resources represent the large majority of costs on most projects, and the industry employs an extremely diverse range of people from a wide range of occupational cultures and backgrounds, including people in unskilled, craft, managerial, professionals and administrative positions. These diverse groups of employees operate as an itinerant labour force, working in teams to complete short-term projects objectives in a variety of workplaces settings. Hence the industry's project-base structure is made of many disparate organizations, which come together in pursuit of both shared project objectives and individual's organizational objectives. These objectives are not necessarily compatible and they might not align with worker's personal objectives, which can lead to competing demands on those working within project-based environments. These features make the construction industry one of the most challenging environments in which to manage people effectively, to ensure that they contribute to organizational success. In recent years there
has been a widespread realization that construction must improve its workers performance through applying good Human Resource Development (HRD) practice, before it can improve its overall efficiency, productivity, and cost effectiveness. In the United Kingdom, successive government-initiated reports have recommended action on improving the management of people as the cornerstone of strengthening the business and management practice (Latham, 1994; Egan, 1998). However, despite widespread calls for improvement and warnings that to avoid action will threaten the future competitiveness of the industry, the perception remains that HRM is a peripheral function, which has a tenuous relationship with business success.

Texts abound on managing people at both strategic and organizational levels and in the workplace. Both the organizational behavior and the HRM literature are well-established academic disciplines, in which many approaches and techniques have been developed for ensuring that people are managed and developed in ways which align with organizational goals and strategies. But as mentioned before, the construction industry presents a challenge and has the potentiality to undermine the applicability and effectiveness of the HRM function. In particular, the complexity and dynamism of the industry's project base culture threaten to undermine the applicability of many central tenets of the HRM strategy that have been applied successfully in more stable sectors. Thus, before examining the model study, it is important to understand the difficult context in which managers operate in the construction industry.

### 2.4 The Importance of the Construction Industry

Turin (1973) argued that the importance of construction industry in the economy stems from three main features; firstly its size, secondly, it provides predominantly investment goods, thirdly, is that the government is a major client of the industry. He also add that construction is an important industry due to the variety of demand for the essentials project in the life of any nation, which the industry must satisfy:

a) The demand for housing construction;
b) The demand for building construction such as commercial, social uses etc;
c) The demand for heavy engineering construction;
d) The demand for industrial construction including factories etc.

Several writers on the construction industry have attempted to identify its building cycles, Newman (1935, ed. Offori, 1990) referred to the following characteristics of
building: durability, immobility, individual variations and large units. These features had influenced the development of an industry comprising loosely organized firms doing non-repetitive work with handicraft methods, and using a contract system involving a series of sub-contractors. Colean et al., (1952, ed. Offori, 1990) described the construction industry as having several different sectors producing heterogeneous products, which were immobile, complex, durable and costly. Turin (1980) ascribed the following features to construction items: immobility, uniqueness, heaviness, bulkiness, complexity, long duration of production process, high expenses and durability, and observed that whereas a few of these might be shared by other artifacts, no other products shared them all. Nam et al., (1988), after receiving other works on the issues, considered the following major features of constructed products as having implications for construction technology, immobility, complexity, durability, costliness, and high level of social responsibility. The construction industry has single characteristics, which are shared by other industries, but in combination they appear in construction alone, making it worthy of different treatment. These characteristics fall into four main groups, which are:

a) The physical nature of the product,

b) The structure of the industry together with the organization of the construction process.


The prominent size of the characteristics of the construction is very important because changes in the productivity of the industry affect the national product both directly and indirectly. There are several ways in which the product of the construction can be broken down for the purpose of analysis. Those most currently accepted are:

1. New work, repairs, and maintenance,

2. Residential building, non-residential building, other construction and works,

3. Private sector, public sector,


2.5 The Building Industry: Characteristics of the Construction Process and the Main Problems Facing the Industry

The construction process is long, involved and often cumbersome and inefficient. Its success depends on having the right relationships between the parties to the process. In other words, building is a complex process, involving many different financial interests,
technical professions, productive industries, and labour process. The Tavistock Report (1963) defines the construction process as the whole series activities between the initiating point of a client's needs and the production of a building to fulfill these needs. There are certain characteristics that distinguish a project from a production process. The most important of these are:

1) That it is a non-repetitive on and off operation. Although the organization may be repeating the same job, every project is a unique exercise.
2) That it has a clearly identifiable beginning and end, marking its total duration.
3) That significant changes in its environment and internal operating conditions take place through its duration.
4) That it can be broken down into smaller units at several levels, and can ultimately be described in terms of the tasks or activities involved in completion of the total project.

It is characteristic of the projects that if they are to be carried out successfully they need certain knowledge and guidance in planning, organizing, and controlling the resources involved, especially the human resource. Higgin, G. et al., (1963) describes the building process as: “The development of the relationship among three functions: design, construction, and co-ordination.” The building process is a wider term, which includes all the activity involved in the production of the building product, of which the actual assembly production is only a part.

Bowely (1966) stated that the industry is organizationally fragmented and that its problems of technical backwardness, lack of investment, and low productivity stem from the problems of communication between a myriad of diverse and separate organizations. He also adds that buildings are not so much built by craftsman today as assembled by fitters. Construction is probably closer now to shipbuilding or craft production than it was to building a hundred years ago.

The basis for the change is:

1) New construction techniques
2) New materials and new applications of traditional ones.
3) A large materials and components industry much of it being science based and not within building as such.
4) The diversified nature of that industry and the construction itself.
5) A labour force comparatively de-skilled in the traditional trades and with new skills and the so-called semi-skilled incorporated within it.
6) The growth of large-scale national and regional contractors and sub-contactors especially in fields like electrical, mechanical, plumbing, steel fabrication and erection and interior fitting.

7) The financial intertwining of construction with manufacturing, banking, and insurance, property development and service industry.

The Building industry has been in recent years subject to a number of criticisms concerning its performance in getting projects to completion in a timely fashion and the quality of its output. The most significant must be that of ignoring the question of whether trained labours were available to carry out work that involved different practices and principles.

2.6 The Nature of the Construction Industry

The nature of the construction process is labour-intensive. Construction, as an important factor in development, is comparatively less dependent on fixed capital even in developed countries. W.P. Strassmann (1970, p. 395) quoting M. Arthur Lewis:

"Roads, viaduct, and irrigations canals can be created by human labour with hardly any capital to speak of."

Following Ragnen Nurkse and writers of general development book, Strassmann (1970, p. 395) argues that under-employed or surplus labour could be used with little capital in buildings community development projects or self-help dwelling.

"As has often been noted, construction tended to be labour-intensive actually even in industrialized countries." Strassmann (1970, p. 395).

Construction is relatively labour-intensive in the sense that it uses a larger number of workers per unit of output than that of most other industries. In the strict sense of the term, employment- or labour-intensive projects are all those projects where labour is the dominant resource. This term “employment-intensive” is generally used as synonymous to the term 'labour-based'. Nevertheless, it is important to distinguish between an optimum and efficient (labour-based), and a maximum and possible inefficient (labour-intensive) use of labour.

A maximum use of labour may be preferred to efficiency where income generation and job creation are the principles, short-term objectives- for instance disaster relief, or food-for-work-projects (ILO, 1999). The term labour-based on the other hand indicates that a flexible and optimum use made of labour as the predominant resource, while cost-effective and quality aspects are ensured. Comparative studies carried out in different
countries show that the labour-based option: (a) was, in financial terms, about 10%-30% less costly than the equipment-intensive option, (b) reduced foreign exchange requirements by 50%-60%, and (c) created, for the same amount of investment, two to five times more employment. (ILO, 1999)

However, the physical nature of the work makes construction unattractive to the bulk of the workforce. Construction work takes place in the open. Extreme weather conditions have been found to have severely adverse effects on construction productivity. Studies in the United States (1985) found that work performed at extremely hot or cold temperature was subject to errors in judgment, carelessness, complaints, general lethargy, irritability and poor mental attitudes, together with a decrease in quality of workmanship, general slow down of work pace and unscheduled work stoppages. The materials used are bulky, and the work involves a large number of small, repetitive, and often wet operations undertaken by different teams of workpeople. As well, sites are often messy, untidy, and hazardous. Construction accounts for the disproportionate share of personal injuries due to accidents in the workplace, and a relatively high proportional of fatalities from such occurrences. Owing to the brawny and unattractive nature of the work, construction can only recruit its personnel mainly from the category of society who are able and willing to withstand the difficult conditions, and often the social opprobrium.

After surveying the working environment in construction in 17 member countries, the Economic Commission for Europe (1985, p.1) noted:

"The working environment in the construction industry is generally considered less favorable than in other industrial branches. The work is, in many cases, heavy and dangerous; the accident rate is high. Work must sometimes be performed in extreme weather conditions and there is often seasonal employment. The insecure employments, the need to work far from home, and the negative aspects of working conditions influence the attractiveness of the construction industry... In one case the favorable aspects of construction work mentioned, for example, independence and craft-like occupations."

2.7 The Place of Construction in the National Economy

Turin (1980, p. 271) states that:

"Construction is the only sector of economic, which appears twice in the national accounts presented according to the United Nations recommendations. It is one of the eleven sectors of analysis of Gross Domestic Product (GDP) at the factor cost by industrial origin; but construction is also a component of fixed capital formation in the composition of Gross Domestic Capital Formation (GDCF) by the type of assets. Finally, construction appears as a separate entry in labor statistics reported by the International Labor Organization."
Construction is one of the economic sectors covered by quarterly and annual statement of national accounts. Toh (1988) remark that the construction industry is unique among the sectors of the economy in that it appears twice in the national accounts: under Gross Domestic Product (GDP) and also under Gross Domestic Capital Formation (GDCF). Information on construction industry is generally published under heading such as: Gross output, Capital formation, and Value added. (1) It is important to identify the part of the economy to which the construction industry belongs since policies and programs are often formulated for multi-industry sectors. Turin (1973) argued that services are currently receiving emphasis in many industrial countries and are replacing manufacturing as the dominant sector of the "post-industrial economies." According to the Offori's definition, the construction assembles what other sectors of the economy produce. Therefore it appears to be a "service industry. Channon (1978), in his analysis of the structure of the economy of the U.K. considered construction one of the services industries. However, not all economists categorize construction in this way. For example, Browing and Singleman (1957) included the construction industry and various forms of manufacturing in the "transformative" sector. They classified engineering and architectural services as "producer services." The Asian Productivity Organization, (1983) assets that construction is a production, and not a service activity since it results in identifiable physical products. There is a clear link between infrastructure provision and total output of the economy:

(1) The gross output of the construction, usually measured in producers' prices, is the sum of: (a) The total of new work, repairs and maintenance carried out on own account, or for other clients; (b) The value of sales of other products of construction enterprises; (c) The sales value of goods sold in the same condition as purchased by construction enterprises; (d) Rents received on the buildings, machinery and equipment own by the enterprises including imputed rent for owner-occupied premises. (ii) Capital formation: in construction is the total value of all new construction and all capital alterations or extensions that significantly improve upon the utility or extend the life of the building or works. (iii) Value added: the concept of value added is used to assess the relative importance of the various sectors of the economy. Value added at each stage in a productive process is simply the difference between the value of the product at the end of the process and that of the inputs used in its production. Value added in construction, also termed "net output", is the gross output at producer's prices less the value of all industry's current purchases from other enterprises at purchaser's prices, i.e., (1) value of materials and components consumed; (2) cost of hiring plant; (3) cost of goods sold in the same conditions as purchased; (4) legal and other professional fees; and (5) payments made for repair and maintenance undertaken by others on the construction firm's own assets. Value added in construction is often referred to as the contribution of the industry to GDP. Defined in this way, it is clear that it is the sum of income payments to the industry, comprising: (a) Salaries and wages of employees; (b) Interest on borrowed capital; (c) Net rent (d) Profit; and (e) Allowance for depreciation.
A World Bank study (1994) of 63 countries showed that a 1% increase in the stock of infrastructure coincided with 1% increase in total output or Gross Domestic Product (GDP), across all countries. In addition to the direct value added to the economy, construction also has a double stimulatory effect on other sectors of the economy.

Firstly, it stimulates the supply sectors that supply inputs to the construction process, for example manufacturing of tool and equipment, production of building materials, engineering and architectural firms, etc. Then, after construction, depending on the type of infrastructure, new businesses can be set up: there will be more output and more trade. The sector further contributes to the economy through a certain amount of direct and indirect job creation.

The most comprehensive study of the role of construction in development was made by Turin (1973). After studying the economies of several countries, he made the observations listed below:

a) Value added in the construction was in the range 3% to 5% in the developing countries and 5% to 9% range in industrialized countries,

b) Capital formation in construction was 6-9% of GDP in developing countries and 10-15% in industrialized nations. In all countries, construction accounted for 45-60% of capital formation,

c) The construction industry bought between 50 and 60% of its inputs from other sectors of the economy,

d) Developing countries directed 30-55% of construction investment to civil engineering whereas the developed nations devoted 25-30%.

Later studies by the World Bank (1984), reached similar conclusions as Turin obtained equations which, among other things, related value added in construction as a percentage of GDP to GNP per capita and employment in construction to GNP per capita.

A report done by the United Nations Center for Human Settlements (1987 pp. 209-10) supports and summarizes such observations:

"Investment in human settlements is investments in construction, and the labour content is high, providing substantial opportunities for labour absorption and the creation of employment. Investments in human settlements also have broad employment effects through direct and indirect multiplier effects... Countries with large settlement development and shelter programmes tend to have faster economic growth and often faster industrial growth. Singapore is the classic case of a country that chooses construction as a lead sector for its economic development... experience has shown that developing countries
which invest little in human settlement development only 3.5% of its record economic activity go to all forms of construction."

On the other hand, the percentage of the gross national product devoted to capital formation increase with per capita product. Great individual variations are apparent, and the range is very wide, from a minimum of 10% to a maximum of 34%. In spite of these differences, the mean values (23%-25%) for the "industrialized" countries are significantly higher: (15%-18%) than those for the developing countries.

2.8 The Variable Demand for Construction Products and Services

The level of economic activity within the construction industry is highly sensitive to wider economic activity, and construction has always suffered from being first among other industries to be affected by an economic down-turn and one of the last to recover from it (Martin et al., 2003).\(^{(2)}\)

This stems from the propensity for business to curtail construction plans if they face the threat of an economic downturn due to large amounts of capital expenditure involved in construction projects. Conversely, in the event of an upturn in business, construction is likely to be one of the last investments committed to, because it needs a relatively certain period of economic stability and growth ahead. This cycle of "peaks' and toughs in construction demands make it very difficult for companies to retain directly employed workforces and make long-term investments in its core professional staff. Consequently, most construction companies adopt a flexible model of HRM, in which they employ the bulk of their workforce on temporary contracts or as subcontracted labour. This has led to an industry structure in which small businesses vastly outnumber large firms. For example, according to the Australian Bureau of Statistics (ABS, 1998a) Business Register data, only 12 businesses classified as 'general construction' employ 500, or more employees (ABS 1998a).\(^{(3)}\)

Smaller firms are unlikely to have a specialist HRM department, which requires that owners and operational mangers must perform the HRM function without specialist input. Unfortunately, this industry structure is extremely difficult to monitor and control, and this is

\(^{(2)}\) With a few exceptions, most poor countries with this level of construction have show or even rates of economic growth. Deliberate encouragement is able to raise the share of construction to between 6 to 9 per cent. Singapore maintains it for many years at around 15%. With few exceptions, countries that stimulate construction activities and making high allocation to settlement development and having programmes activities fast rates of economic growth, low rate of unemployment and equitable income distribution".

\(^{(3)}\) The majority of Australian construction firms is small businesses; with 97 per cent of general construction business employ less than 20 employees and 85 per cent employing less than 5 employees (ABS, 1998a).
one of the reasons why the construction industry is renowned for poor HRM practices in areas such as training, safety, exploitation of illegal migrant workers, and avoidance of tax payments, workers’ compensation payments, and other legal rights (Martin et al., 2003).

The dangerous result of not being able to control such practices in such a competitive industry is that other companies are forced to lower their performance to the lowest common denominator in order to survive. The large construction firms who employ these small companies, construction clients and government agencies have an extremely important responsibility to ensure that these practices do not occur.

2.9 The Organization of Construction Work

Calvert (1976) states: "Organizing provides the framework of management, which is the static structure upon which the succeeding executives and supervisory functions can be built in accordance with the policy principles determined by the directors." McGhie (1982) in his paper defines management as the “function of division and subdivision of labour." Organization and management are intrinsically interlinked concepts. The former is concerned with organized activity, some pattern of authority and responsibility between the participants and non-human involvement. Decisions, both routine and strategic, are required from management to make the organization operate.

Clark (1972) has described organizational development as "a complex educational strategy that attempts to change attitudes and beliefs and indirectly to alter the structure of enterprises so that they have greater capacity for coping with change. The focus is on the people variable at the point of entry." This definition is useful because of its emphasis on developing people within the context of the organization. The approach is to try to integrate the goals, values and needs of individuals with the collective goals, values and needs of groups as

The performance of individual organization systems was assessed. A numbers of systems also were compared. Franks J. (1984) proposed a method for choosing a suitable system based on the extent to which each helped to meet the client's requirements of technical complexity, aesthetics/prestige, economy, time and exceptional size, or complexity with regard to a variety of inputs. Using that method, he ranked the six selected approaches in the following manner: project management, design and build, separate contracts and management fees, package deal, and traditional method, while suggesting that selection of appropriate systems should always be based on an analysis of the client's needs and the circumstances of the project. Walker et al., (1987) used the techniques of
linear responsibility analysis to study retrospectively the effectiveness of the adopted organization structure for a number of prospects. The consultants appointed first by the client normally make the choice of the organization system. Continuous assessment of the effectiveness of project organization is, almost invariably, not done. Thus, changes in the levels of authority of the individual participants in the course of a project are very rare. Studies of organizational effectiveness are not retrospective, but are also not initiated by the particular participants themselves. That clients have not always been satisfied with the systems adopted is evinced by the attempt by large clients and groups of clients to exert greater control in this respect. The construction process may be divided into 12 international stages as proposed by the RIBA plan of work. The selection of an organization system for a construction project should be a rational process based on the requirements of the client and the circumstances of the project. An analysis of the roles to be undertaken and consideration of the sorts of persons likely to perform them successfully would be essential. This need not be done for every project. Clear statements of specific targets to be achieved at each stage would help monitor the performance of individual participants and subgroups at various stages. Total project objectives and targets are seldom stated and when they are, they are often vague and subjective. Burrows et al., (1983) suggest that even when the various participants interpret the objectives are stated that the various participants interpret them differently.

The construction industry and particularly the building industry are made up of a large number of small firms. Financially, organizationally and technically it is dominated by a very much smaller number of large or medium firms. Traditionally, building firms have been high-risk enterprises with higher than-average rate of bankruptcy.

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4 The evolution of project organization systems has been influenced by several factors within and outside the construction industry. The main forms of organization systems considered are grouped under the following heading:

- Traditional approaches;
- Management-based approaches,
- Integrated services, and
- In-house team.
2.10 Problems Facing the Construction Industry in the Developing Countries

Writers identified several inter-related problems facing the construction industries of the developing countries: (Department of Economic and Social Affairs, 1962; Abrams, 1964; United Nations Industrial Development Organizations, 1967; Andrews et al., 1972; Turin, 1973; Ministry of Works, 1977; Edmonds, 1979), the problems being: (a) frequent shortage of construction material resulting from the preference of users for conventional materials, most of which were imported; (b) low level of technological development of most of the industries, with a shortage of plant and equipment, inadequate of Research and Development (R&D) facilities and programmes, and poor linkage between research and practice; (c) lack of skilled construction personnel, and the poor social images of construction; (d) an unfavorable operating environment for construction enterprises, this further aggravated by complex procedures, and regulations, delays in payments, and unsuitable contract documents, and (c) low and fluctuating overall levels of construction activity. (5)

The construction industry development refers to the application of the principles of economics and management to the construction industry, especially in the context of the developing countries. The CIB TG meeting in Arusha defined it (CIB, 1999 xiii) as ‘...deliberate and effective of the construction industry to meet the national and economic demand for building and civil engineering products, and to support sustained national economic and social development objectives.’ Thus, construction industry development should consider the whole industry: Ofori (1993) suggest that it embraces the development of materials; projects documentation and procedures; technological contractors; and institutions, both public and private.

(5) Before analyzing the problem facing the construction industry, we have to define the term ‘developing countries’ for operational and analytical purposes’. The World Bank (1999a) classifies economies into three main groups using Gross Domestic Product (GDP) per capita, middle income (US$785-US$9656) and high income (above US$9656 in 1997). The Bank notes that ‘classification by income does not reflect development and status’ (p. xxiv). The United Nations and its agencies use a similar classification. The term ‘developing countries’ refers to the low and middle-income countries (high income nations are commonly termed ‘developed’ or ‘industrialized’). The economies of the Arab States in the Middle East have become increasing interdependent over the past three decades, with the labour-scarce, oil-rich economies in the Gulf Cooperation Council (GCC) states depending on migrant labour from their neighbors.
Turin (1973) identified in his matrix, Fig. 2, of construction industries in developing countries 'international -large' projects, which are large and complex, and can be undertaken only by foreign contractors.

Fig. 2  Matrix of the Construction Industry showing Key Features of Sub-Sectors. (Turin, 1973)

Edwards and Miles (1984) observed that 'international contractors' are prominent among large construction firms in developing countries. Drewer (1980) noted that at the early stage of their development, countries require a wide range of projects, some of which their indigenous firms lack the capacity and experts to take. Thus, they must rely on foreign firms. Turin (1973) urged developing countries to use foreign firms to improve their construction industries. However several authors highlighted the difficulties, including the tendency of foreign contractors, to be guided by short-term profits and to adopt strategies which did not support host countries' effort to develop their industries (Cockburn, 1970). Moavenzadeh et al., (1984) see foreign contractors as the sole factor in influencing the development of the construction industries of poorer countries. Ofori (1996) noted that the objectives of foreign construction enterprises and host developing country governments differ.\(^6\)

\(^6\) Many aspects of technology may be considered to highlight its complexity. Its linkage to social systems (Goulet, 1977; Galtung, 1979; Karatsu, 1990, Mtewa, 1990) is perhaps most relevant. UNIDO (1980) consider technology as a 'not neutral' (p.3) entity, incorporating, reflecting and perpetuating value systems.
Technology may be defined as the application of existing body of knowledge (science) to the production of goods and services. It embraces equipment, tools, technique, materials, systems, processes, information, the goods and services produced and their uses (Stewart, 1977; Streeten, 1991). Writers disagree on many of the definitions, causes, implications, and effects of aspects of technology. But, there is a general agreement that technology is critical for development (Goulet, 1977). Various 'types' of technology are often distinguished. Goulet (1977, p.178) differentiates between 'modular' (core) technologies 'which are indispensable' to the success of an entire process and 'peripheral' (ancillary) ones, which constitute the rest.

Westphell et al., (1985) categorize technological capability into three broad areas: production (for operating productive facilities), investment (for expanding capacity and establishing new productive facilities), and innovation (for development technologies).

The main aim of technology transfer is to effect technological development. It is pertinent to consider the latter briefly. Various writers discuss causes, effects, prerequisites and advantages of technological change (Bowely, 1966; Marx and Engels, 1970; Caldwell, 1972; Maitra, 1980; Podder, 1998). The pace of technological change differs from one country to another. It requires capital, appropriate socio-economic conditions, and organizations that can take advantage of opportunities offered by new technology culture.

This means that technology transfer implies the transfer of social structure. Moreover, Rosenberg and Frischak (1985) suggest that technology any enterprise uses is specifically chosen and shaped by company's learning experiences: this complicates the transfer process. Studies show that factors including differences in resources, wealth, religion, customs, climate, political system and trading conditions can hinder the transfer of technology (Jones and Gamser, 1987; 1987; 1991).

Many authors highlight both positive and negative aspects of the operations of foreign construction firms in developing countries. The adverse effects include: loss of track record opportunity (Ofori, 1996); possible loss of confidence of local contractors (Hillebrandt, 1999); and leakage of funds (Haavaldsen). The positive impacts include: realization of national development objectives through completion of sophisticated projects (Drewer, 1980); business opportunities for local contractors through subcontracting and strategic alliances (Ofori, 1996); and learning opportunities for local enterprises through technology transfer (Ofori and Chan, 1999). Strassman and Wells (1988) note that Japanese and South Korean contractor benefited from technology transfer from theirs US counterparts. Ofori and Chan (1999) show that both local and foreign contractors in Singapore have benefited from the latter's operations. Rashid (1993) draws lessons for developing-country contractors from the international operations of foreign firms.
Technological development requires financial resources, conducive economic conditions, relevant administrative support, organizations which can apply new technology, a suitable physical infrastructure and supportive culture. Most of these are weak in developing countries (Simmons, 1969; Steward, 1991). Technological change benefits organizations, often leading to higher efficiency of processes, larger productive capacity; increased density of activities; higher accuracy of products (Van Wyck, 1988). Podder (1988) suggests that faced with a set of technologies, an entrepreneur always chooses the most cost-effective which, given prevailing constraints, is usually the latest. However, Moore (1982) believed that firms seldom make the optimum choice owing to gaps in knowledge about technology and firms' tendency to be averse to risk and cautious about change. Given the wide range of possible choices and as changes may arise from greater knowledge about and also adaptation of existing technologies, change is not necessarily a progression towards the most modern computer-controlled capital-intensive process.

Construction technology embraces the materials, plant, and equipment, organizations, procedures, and information systems used in planning, designing, constructing, maintaining, repairing, altering, and demolishing buildings and infrastructure. Construction technology development involves both the imaginative solutions to specified problems and the development of alternatives to existing materials, methods and so on (Madewell, 1986). Some writers consider as the key to construction technology development, a particular set of systems such as standardization and industrialized construction (United Nations, 1959, 1974) and computer applications and robotization (CIB, 1989). There is a common perception that construction everywhere lags behind other sectors at the level and pace of technology (Business Roundtable, 1983; Nam, and Tatum, 1988). Some writers, who dispute this, question the accuracy of the usual measures of construction productivity (Rosefield et al., 1979; Bowely et al., 1986); others highlight progress made in construction technology (Jepson, 1987; Chow, 1990). The technological development of construction industries of developing countries is low, both in comparison with their counterparts in industrialized countries and considering their present and future tasks.

Several factors give impetus to technology development in construction. First, changes in the nature of the buildings and works demanded by clients result from economic, social, and technological change (market pull) (Ofori, 1990b). Second,
increasing scientific and technical knowledge within or outside the industry makes new materials, equipment, and methods available for application (science-technology push) (CIB, 1989). Third, shortage or increasing cost of resources influences change (necessity leading to innovation) (Ofori, 1990b). Fourth, construction companies seek to enhance their competitiveness through innovation (intra-industry competition) (Hasegawa, 1988; Tatum, 1989). Fifth, professional institutions and trade associations attempt to extend the scope of activities of their members (Brandon et al., 1988). Finally, the government endeavors to upgrade the construction industry (CIB, 1989). Respondents to surveys in Singapore ranked benefits they obtained from application of new construction technologies as follows (Ofori, 1990a): faster project completion, improvement in quality of workmanship, reduction in labour requirement and lower overall operating cost.

2.11 Construction Industry as Employer

The construction industry employs a large proportion of the civilian labour force in countries at all levels of economics and social development. The most obvious indicator of the significance of construction in employment is, of course, the share of construction in the total employment. Turin (1973) stated that for thirty-two countries, series are available of the breakdown of the employed by major divisions of economic activity including construction for the period covering 1958 to 1966 or 1967, in the first group of countries i.e. those having a per capita GDP of 400 US$ and above in 1965. The construction accounted for a minimum of 3% to a maximum of nearly 12% of total employment over the period observed. Countries in groups with per capita GNP of less than 400 US$ in 1965 cover a much wider range from a minimum of less than 0.5% to a maximum of nearly 12%. Turin (1973) add that construction accounts for between 6% and 10% of the total

for customers and poor financial returns (Ball, 1998; Hindle and Rwelamila, 1993); - a dramatic fall in apprenticeship numbers (Buckley & Enderwick, 1989; Alman, 1989); - a declining industry image (Ball, 1988; Hindle & Rwelamila, 1993); and - large-scale unemployment amongst professionals in construction (Crisnon et al., 1994; Hindle et al., 1993). Changes are also occurring to industry procedures and many of them threaten the traditional structure. These changes include: - new 'building procurement systems' (BPRs).

(8) The notion that expanding human capital, just like physical capital, results in higher growth and productivity has been acknowledged since Adam Smith and emphasized more recently in the development literature since the 1960s (Schultz, 1961; Becker, 1964). Since the mid 1980 there were wave so-called endogenous or "new" growth theories that focus on increasing returns investment, not only in physical but also in human capital. The "new" growth theories have rediscovered the virtues of human capital with a great deal of vigor. It has become an endogenous variable that drives the growth process through multiple channels. These considerations allow endogenous growth
employment in a majority of the more industrialized countries, and from between 2% and 6% in the less developed ones.

Employment in the building materials and components industry, in the transport, stock, and distribution of building materials and other ancillary operations connected with construction, is not identified separately in national series. Evidence derived from censuses of industrial production shows that these related activities may add another 4% to 6% to total employment in the developed countries, and probably 2% to 4% in the less developed ones. This means that construction as a whole, i.e. including the production and delivery of material inputs, can account for as much as 15% of the total employment in some of the more industrialized countries of the world, and as much as 10% in the less developed ones.

2.12 The Labour Market and the Image of the Construction Industry

Employment of craftsmen in construction activities is characterized by instability. Contractors normally hire workers for specific projects that have a finite duration. Thus, a construction worker is hired on a project with the objective of being laid off when it is finished. As a consequence of this instability, an area of pool labour does not characterize the construction industry. This allows for the movement of workers among contractors, different branches of the industry (industrial, residential, non-residential and heavy construction), and jobs that are being completed and others that have increasing manpower needs. Contractors in need of workers hire from the area pool of labour and return workers to the pool when they are no longer needed. Like any industry, the construction industry has to compete for its workforce from the limited pool who is able and willing to work.

Historically, this has not been a problem for the construction industry. Martin et al., (2003) argue that any sustained downturn in population growth, in many developing countries, and changes in gender demographics affecting traditional recruitment sectors have made this market more competitive and raised the real possibility of the industry being affected by skills shortages in the near future. Labour market present a concern for theorists to claim that "...the main engine of growth is the accumulation of human capital...and the main source of differences in living standards among nations is differences in human capital" (Lucas, 1993). The public policy implications of the new growth theories would indeed point to a presumption in the favor of government intervention going beyond compensating for market forces to more deliberate and aggressive investment in education and training, including a move from low-skill labour-intensive products to more skill-intensive goods and services, thus attaining rapid, internationally oriented growth.
all industrial sectors, as falling birth rates lead to competition between sectors for an increasingly limited pool of job candidates. It is inevitable that in this environment less attractive industries will be unable to recruit their share of high-quality schools and university leavers, and will eventually suffer from skills deficiencies. Clearly high-achieving individuals are likely to gravitate towards industries and sectors which are seen as offering good wages, good working environment and good career opportunities, and as being the most glamorous and attractive to work in. Thus, the unattractiveness of construction as a career choice has become a topic of concern and debate amongst the industry's various bodies and training organizations. For instance, according to the American Jobs Rated Almanac, (edition 1999) civil engineering fell from 18th to 70th position in expressed job and 14 construction trades were rated in the bottom ranks. Given the shrinking labour market and images problems of the industry, it is clear that further economic growth is likely to lead to severe shortages in both traditional and new skills areas (Agapiou et al., 1995b).

The incumbents on those working within the construction sector have to work to improve the image and the attractiveness of construction as a career option. The reality is that the industry has a long way to go in improving its stereotypical image. Indeed, research has shown that it is currently regarded as having an occupational status similar to that of a cottage industry (Gale, 1994). Because of the nature of the industry, small shortage and surpluses will occur for brief periods of time. The real concern is when the situation becomes grossly out of balances for extended periods of times. Shortage results in hiring of unqualified workers, the use of overtime to maintain schedules, and increased wages to attract workers. Training and development is the most effective way to maintain, update and enhance the intellectual capital of the industry workforce and to ensure that its activity contribute positively to the well-being of society as a whole. Indeed, concerns over the quality of recruits to the construction industry have been a major problem recent years and this has led to a range of training initiatives. Construction trade training is likely administrated by the industry itself in different countries (such as Construction Industry Training Board (CITB) in the United Kingdom, Sticking Vakopleting Bouwbederijf (SVB) in the Netherlands, National Training Institute (NTI) in Ghana, the Construction Industry Training Center (CITC) in Singapore, and Construction Training Australia (CTA) in Australia.

In the recruitment climate mentioned above it is increasingly important for the construction to retain their professional employees in order to remain competitive.
Employee turnover or 'wastage' is an extremely important issue for construction companies' strategic HR planning yet, a culture of mobility has emerged in the industry which has led to a workforce (9) of corporate mercenaries that coldly drift from job to job with little sense of loyalty to their employers. This should be a worrying development for any company that takes training seriously, although, such companies are likely to experience less labour turnover. This is due to the cost of training staff where they are sufficiently productive to generate income. In the U.K. industry there are concerns that staff turnover may increase even further as staff shortages intensify and competition between different employers increases. In a recent survey conducted in the U.K. a 42 % construction professionals said that they were actively looking for new positions (J.Ford, 1997). Thus the need for companies to retain their staff seems to become a major HRM issue in the construction industry of the future. Without an increase in labour resources, only companies offering competitive salary packages, good working conditions and exciting career opportunities will be able to satisfy their labour requirements. Indeed, recent reports suggested that skills shortages are already leading to increased salary levels (Cargill, 1996). However, increased remunerative costs lead to competitive labour markets, which has inflationary effects on the cost of construction work (Agapiou et al., 1995b).

For this reason, Briscoe (1990) predicated that U.K. Construction Company might start to lose projects to other countries if wage levels increase as a result of skill shortages, which may threaten the future growth of the U.K. industry. Thus it is essential that the industry addresses its image problems and begins to recruit from non-traditional sectors such as women and, in some countries such as the U.K., ethnic minority groups.

(9) The reason put forward for the construction industry's poor public image have been numerous, and they include:

• The site based and hence itinerant work patterns, which result in job insecurity or require many construction workers continually to relocate in pursuit of new project opportunities;
• The poor on-site working conditions, health and safety record and employee welfare provision within the industry,
• The industry's association with manual, blue-collar occupations rather than more highly regarded white-collar positions
• The male-dominated and discriminatory 'macho' culture that is commonly portrayed as the way the industry operates.
2.13 Self-Employment in the Construction Industry

The construction industry relies on subcontracting for the majority of its production effort. Hence the construction industry comprises a large number of small and medium-sized enterprises, which operates in subordinate productive role to larger 'main' contractors. In the U.K. self-employment is higher than any other European country at around 45 %, compared to 10 % in Germany and 18 % in France. The rise of self-employment amongst construction workers in the U.K. can be traced back to the 1980s and early 1990s, when a political agenda of de-unionization, a philosophy that small is beautiful, and favorable tax reform made self-employment a lucrative option for many skilled workers (Martin et al., 2003). This more flexible structure was perfectly suited to the fluctuating workloads of the construction and led to major structural changes where the majority of the workloads became self-employed.

However, this also produced problems of reduced control, which lies at the heart of many of the industry's inefficiencies today. Research also suggests that small business does not manage occupational health and safety risk as effectively as large business, and may be unaware of their responsibilities under occupational health and safety law (Lingard, 2002). These factors present difficulties for the prevention of occupational injuries and diseases, which likely contribute to the higher incidence of occupational injury in small construction firms (MacVittie et al., 1997).

2.14 The Impact of Change in the Construction Environment

Changes is occurring and the pace would seem to be accelerating. Whilst this is not unusual, it would seem that these have occurred in a common time frame, and apparently, under differing circumstances.

Changes in technology have generally resulted in a shift from traditional craft skills towards engineering and assembly. (10) The main areas of technological change are:

- The development of 'construction marketing systems' (CMS),
- growth in the number and quality of specialist contractors and subcontracting,
- contractors' involvement in construction projects at an earlier stage;
- customer-designed contacts, systems and procedures,
- the advent of 'project management', and the movement of engineers and quantity surveyors into this field, and
- the use of personal computers and specialist software to simplify complicated tasks.
Information technology,
Mechanization,
Prefabrication,
New material.

Mechanization is occurring through the development of hand power tools and larger items. Prefabrication modular components in the form of large assemblies and smaller sub-systems are used extensively in the commercial sector. The range of new materials entering the construction markets presents difficulties in making appropriate choices: such choices often require new skills and knowledge.

Despite evidence in the mechanization of the building process, the industry is still highly labour-intensive, and several pressures have coalesced to seek a greater intensity of output from the labour working in the industry. These pressures have been launched from many fronts; at government level the call for productivity improvement level has been consistent for the last three decades and this has been reflected in the numbers of reports that call for productivity improvements in construction (Emerson, 1962; Banwell, 1967; Slough, 1976; Potts, 1967; Wood, 1973; and Easter Building for Industrial, 1983).

Groak (1990) applied the findings of Emery (1969) to the building industry and advanced the view that building failures are a symptom of uncertainty and change in the trading environment (a turbulent environment).
Chapter 3: Theoretical and Conceptual Considerations

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3.2 Research Design
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CHAPTER 3

THEORETICAL AND CONCEPTUAL CONSIDERATIONS

3.1 Introduction

Sustained organizational success can only be achieved through the workforce. There are a number of techniques and examples provided in the study to illustrate how successful firms can think strategically about human resources to accomplish their strategic and operational goals. Unfortunately, few firms in the construction industry use Human Resource Development (HRD) as a source of competitive advantage. Instead, most rely on financial or technological acumen and scientific management techniques which place ever-greater expectations on their employees’ goodwill and stamina, and take for granted their commitment and skills in being able to rise to any challenges presented. However, considerable evidence suggested that this approach is unable to produce the productivity and improvement the industries are demanding.

The study raises many questions:
- since the construction firms or contractors are not responsible for the training and development of its labour forces, and since there are no institutions for training in the building industry in Sudan similar to Construction Industry Training Board (CITB) in United Kingdom and since it was the policy of the government to reduce government expenditure and services: - who are the potential, regional, national and international training providers for all categories of personnel in the Sudanese Construction Industry?
- Who is responsible for the quality of the capacity building in the Sudanese Building Industry?

There are also, some proposed suggestions for more studies of HRM in construction industry and for more measurement of the output of the end-result, and performance of the construction project at the execution level.

3.2 Research Design

Moser and Kalton (1971) and Babbie (1973) argued that a combination of methods is often more useful than a single one. Using different methods yields different kinds of data which, taken together, facilitate a more comprehensive analysis of the phenomena being studied. Moser and Kalton (1971) also contended that some methods became more
appropriate than others at different stages in an investigation. To consider every variable that impinged on the study might be of little scientific value, since it would limit the writer's ability to generalize from the results, yet it seemed important not to converge on a few familiar variables. Therefore, the study attempts to identify as many variables as possible and to concentrate most on those that seemed significant. The methodology is composed of literature survey, case study and the questions for the managers, the unstructured interview. All these techniques were used to identify variables and isolate the important ones. The key models from Fig. 3 to Fig. 8 with its variables, was selected early in the study and correlated well with what managers thought were the significant and modified models later.

The study attempted to achieve a reasonable compromise between academic rigor and practical relevance, so the research focused on the application of ideas about developing the human resources and on suggesting improvements, based on a reasonable rigorous empirical framework. Sarre (1975) is among writers who stress that most social research methodologies share this dilemma. The case study, which attempted to construct detailed descriptions of the human resource development activities of selected firms and selected workforces. The purpose of case study was to compile detailed accounts of current human resource development practices in selected companies.

As a method of social investigation, the case study differs from most other techniques, in that it looks at a particular case, rather than a cross section of the population being studied. An important strong point of the case study is that, unlike other research methods which focus on a few variables, it attempts to build a thorough description of the features being studied. It encompasses relationships between numerous factors and, whilst one case study would lend little support to any hypothesis, a number of such studies would begin to do so. The case study will, at best, illustrate some general features of human resource development in firms that are similar to the one being studied. It will not, however, give a reliable indication of what is happening in other kinds of firms.

This thesis investigates the process involved in the development of human resource in the building industry, particularly in the Sudanese building industry. The study includes an appraisal of human activities in the building industry, which is important for understanding development objectives and for the evaluating of the effectiveness of current development practices.
3.3 Management and Organizational Behavioral Science Research

Pugh (1979) defined ‘organization theory’ as the study of the structure and functioning of organizations and behaviour of groups and individuals between them. Kandwalla (1977) states that the subject matter of organization theory is the study of the structure of organization, the process of by which it functions, the determinates of its structure and functioning, the way groups and individuals working in an organization affect the organization and how they in turn are affected by the properties of the organization. Organization has been defined as a ‘systematic arrangement for a definite purpose’, (the shorter Oxford English Dictionary).

Organization and management of construction activity, being a rather new and interdisciplinary field of study, showed a relatively low development in comparison with general organization theory:

"Efficiency may maximize through objectives measure (like improvement of work methods)". Burrows, B.G.; Seymore, D.E. 1983

From the above quotation, it seems necessary to review contemporary organizational effectiveness. Sey et al. (1981) argue that approaches to organizational effectiveness rely on 3 models: - the goal attainment model, the behavioral model, and the systems model. The goal-attainment model defines effectiveness in terms of the degree to which the organization achieves its pre-established goals, in other words, the extent to which the goals or objectives are fulfilled. (Price, 72; Hall, 72; Steers, 75; Perrow, 61; ed. Sey et al., 1981). Goals are usually defined as future conditions that organizations try to achieve. Criticism of the goal-attainment models centers on the following points:

- the distinction between the official and the operative goals of an organization,
- problems in the measurement of achievement.

On the other hand, the main assumption behind the behavioral approach is that organizations exist for human benefit, and that goals carry importance in so far as they contribute to the satisfaction of the participants (Barnard, 38; Cyert et al., 63; Friedlander et al., 67, ed. Sey et al., 1981).

These approaches emphasize criteria such as employee satisfaction, absenteeism, morale, interpersonal relations, absence of tension and conflict, commitment. The system approach to organizational effectiveness combines elements from the foregoing models and organizational process, emphasizing their significance in terms of the subsystems of the organization as well the environment (Etzioni, 60; Parsons, 56; Metron, 57 ed. Sey et al., 1981).
The processional variables define the organization's external and internal operations. These variables include flexibility, creativity, adaptability, manpower acquisition and retention, acquisition of resources, control of the environment, and contribution to the supra-system. There is an interaction between these systems, and there is a hierarchy of systems and subsystems. Kast and Rosenzweig (1981) viewed the organization as an open socio-technical system composed of a number of subsystems, as illustrated in Fig. 3. Under this view, an organization is not simply a technical or a social system. Rather, it is the structuring and integration of human activities around various technologies. The technologies affect the types of inputs into the organization, the nature of the transformation processes, and the outputs from the system. However, the social system determines the effectiveness and efficiency of the utilization of technology.

Applying this concept to the construction industry, the organization of a building project becomes a process of structuring and integrating human activities around various technologies. The network of relationships and procedures created by the organization structure of a project can be considered as the third sub-system, mediating between task and human subsystem. Indeed, Miller et al. (1967) contend that temporary activity systems, such as building projects, form the most appropriate basis for a general theory of organizations. The essential feature of a temporary activity system is that the organization is created to perform a specific task, and is disbanded when the task is finish. In a construction project, the task is fairly clearly defined and the necessary inputs of resources fairly readily prescribed. Various key dates provide temporary boundaries to the project organization. The construction industry has to have a mechanism for setting up, organizing and disbanding these project teams, some of the approaches to which are described by Wearne (1971). The essential problem is that of co-coordinating and integrating the various groups and individuals who make up the project team but whose primary allegiance is to their parent organizations which may be committed to different and possible incompatible objectives.
The major obstacle study organizational behaviour and design for building projects is that building team members tend to be predominantly concerned with technical problems. The strategic issues are mostly dealt with by the parent organizations. Given this limitation, the open system approach is useful for providing a macro framework within which the conceptualize the organization of projects and its enables concepts from various perspectives to be integrated. The insight gained may be rather abstract and generalized, but they are useful in conditioning our approach to the study of such organizations. One important outcome has been that our conception of organization has changed from one of structure to one of process (Young, 1972).

The modified Kast and Rosenzweig (1981) model (Fig. 3) by Harding (1980), (see Fig. 4) called for a view of construction organization as a system composed of six subsystems:
- the people subsystem,
- the technology subsystem,
- the managing subsystem,
- the purpose subsystem,
- the culture subsystem, and
- the structure subsystem.

Shaddad (1983, pp.82-87) argued that Harding's (1980, pp.16-22) model does not put emphasis on the role of the managerial subsystem as an integrating and controlling factor of the other subsystem. Shaddad (1983), proposed a more comprehensive model (see Fig. 5), suggesting that the project managerial activities can achieve a maximum productivity of the construction project by the following seven subsystems: -
- Organization of the environmental subsystem,
- Organization of the resources composition subsystem,
- Organization of the capital resources subsystem,
- Organization of the information subsystem,
- Organization of the structural subsystem,
3.4 The Conceptual Framework of the Behavioural Sciences Theorist

A good deal of theorists in the behavioral sciences suggests that there are four primaries determinate of organizational productivity: the environment, organizational characteristics, work characteristics, and individual characteristics. A schematic representation of the conceptual framework used in this thesis is presented in Fig. 6. Changes in organizational and work characteristics (casual variables) are seen as
influencing various individual characteristics (intervening variable) which in turn affect three end-result variables: work behaviour, job performance, and organizational effectiveness. Productivity indicators can meaningfully be computed for all three end-result variables. The model as hypothesized states that system productivity, the end-result variable, is a function of all variables, and changes in any variable cause changes in system productivity. Considerable improvement can be achieved through improvement in any one of these variables, but for systems productivity maximization, all variables have to be considered together.

The subsequent stages of this study will be directed towards the operationalization and integration of the seven interrelated subsystem variables (Shaddad's model Fig. 5) with the aim of developing the conceptual framework of the determinates of performance of the project as in organizations-behaviour science model (Fig. 6). The variables listed above will be taken into consideration in terms of both:
- Parents' organization,
- The project organization.

The weighing of these variables may differ according to the level in question. It is also necessary to consider the interaction of these levels in the formulation of the model. The operationalization of the variables in the framework presented will be followed by empirical testing of the model.

The basic casual model links project managerial activities, the primary variable, with system performance, the end result. The model as hypothesized states that system performance, the end-result variable, is a function of all seven variables causing changes in system performance through a number of unspecified intervening variables. Although considerable improvement in system performance of the project can be achieved through improvement in any one of these subsystems to maximize system performance, all subsystems must be taken into consideration. Feedback mechanisms are fundamental to any process based upon the scientific method.

The framework will act as a basis for the developing a casual model of the thesis, which will involve classifying the existing construction literature and relevant literature into categories represented by the variables and their element. The framework will also act as a source of research hypothesis arising with interaction among variables.
Environment

**Organizational Characteristics**
- Reward systems
- Goal setting
- And MBO
- Selection, Training
- & Development
- Leadership
- Organization structure

**Work Characteristics**
- Objective Performance
- Feedback
- Judgmental Performance
- Feedback
- Job design
- Work schedule

**Knowledge, Skills, abilities, Motivation Beliefs and Values Attitudes**

**Work Behavior Productivity**

**Work Performance Productivity**

**Organizational Effectiveness Productivity**

Fig. 6 Conceptual Framework of the Determinates of Productivity in Organizations-Behaviour Science Approach (Kopelman, 1986)
3.5 Proposed of the Framework of an Analytical Model in Evaluating of the Effectiveness of Project Organization

As a result of the research conducted with the aim of developing a model of performance of the project, the variables influencing the end result in the performance of the project organization were classified under seven headings according to Shaddad (1983) model. The weighing of these variables may be differing according to the level in qualities. The operationalization of variables in the framework presented will be followed by the empirical testing of the model.

Fig. 7 General Model of Organization as an Open System by Kast and Rosenzweig (1981)

Kast and Rosenzweig (1981) considered organization in terms of a general open-system model as in Fig. 7. The open system is in continual interaction with the environment and achieves a “steady state” or dynamic equilibrium while still retaining the capacity for work or energy transformation. The survival of the system, in effect, would not be possible without continuous inflow, transformation, and outflow. A system model allows the investigation of the interrelationship between the parts (subsystem) and how the relate to the whole (building process or industry). Modeling is the vital facet of the ‘system approach’ that approaches problems by treating them principally as a whole, and then
proceeds from the general to the particular with a minimum number of preconceived notions. It means the avoidance of the artificial exclusion of ‘outside factors’ that may in fact decisively influence the nature of the problem. All aspect of the variables in the subsystem affects each other in a series of links and relationship of varying importance. A particular group will produce a particular set of relationships; this group will separate and re-group to produce a completely new series of relationship- a suitable case for the systems approach, requiring a suitable model.

The simple organization open-system model by Kast and Rosenzweig (1981) in Fig. 7, linking project Managerial Activities, a primary variable with System Performance of the project, can be elaborated further to include the seven managerial subsystem as suggested by the conceptual model presented by Shaddad in Fig. 5. A simplified result is a schematic causal model shown in Fig. 8, with a modification of adding Human Resources Management as central and secondary variable.

The modified model in Fig. 8, hypothesis the basic model linking a managerial activities as an input (as primary variable) with a transformation elements, the seven subsystem (as intermediate variables) and their affect on human resources development (as secondary variable) with the output, system performance of the project (as an end variable). The basic objective of this thesis is the study of the influence of managerial activities on system performance of the project. Fig. 8 show a modified system model in which the characteristic of managerial activities are seen as independent variables (i.e. input), the 7 subsystems (primary variables) and their variables are intervening (moderating) variables which are selected to achieve the optimum level of dependent variable, project performance (i.e. output). Therefore, the model in Fig. 8 will form the basis of this study.
Fig. 8 Modified and Basic Model linking Project Managerial Activities With System Performance of a Project
As mentioned before that any changes in the primary variable of the Managerial Activities (input), cause changes in the end-result variable which is the System Performance (output) through a set of unspecified intervening variables (transformation process). So, System Performance of the project (time, cost and quality) is the main objective of project’s managerial activities. The definitions of system performance of the project are restricted in chapter 1, and release the other chapters to consider and draw, in details, upon the existing literature review to define the unspecified intervening variables connecting the Managerial Activities (input) with the System Performance (output). As the case studies and discussion contained within the study emphasize, we do not believe that there is a single definitive model for managing workers in the construction industry in order to achieve a high level of a project performance. There is no magic formula for resolving the significant HRM challenges which the construction industry poses, but we hope this study will help managers develop and explore approaches which reflect the particular needs of their organization, project and employees.

3.6 Classification and Numbering of the Variables

The system and contingency theories aim to establish a relationship between the subsystems and try to explain causality. The design of a model becomes useful; such a model provides a framework for the problem and should consist of components (i.e. subsystem) which represent discrete and identifiable components in the physical reality to be studied. It shows the linkage between the subsystems that are under investigation. Naoum (2001) identified three types of variable that are commonly used to construct a model, as follows:

(a) Independent variables (inputs). This is the component or subsystem that does the causing and which, when varied, appears to induce change in another variable (or subsystem), and which are not under the control of the system. In the system of this model, they include task and general environment variable, size of project, geographical location, etc...

The numbering of the variables of this group start with zero;

(b) Dependent variable (outputs). This is the component or subsystem which is acted upon or caused by the independent variable. It is usually related to effectiveness and performance. The dependent variable have been categorized in Fig. 9 into two groups, these are:
(i) the primary variable: it is the variable assumed to be the cause of change in other variables of the system. As stated earlier, and illustrated in Fig. 4, project managerial activities have been taken as the primary variable of this study. The numbering of the variables of this group will start with one;

(ii) The secondary variable: it is the functions of primary and independent variables. As stated earlier and illustrated in Fig. 4, seven sub-systems have been defined by Shaddad as the secondary variables for the modeling of this study. The numbering of this group will start with two;

(c) Intervening/moderating variable (process). This is the transformation or conversion process that explains linkages between the dependent and independent variables, and can cause the relationship between them to change. The intervening variables of this have been categorized, as illustrated in Fig. 9 into 4 groups, these are:

(i) First group of intervening variables. The numbering of the variables of this group will start with three;

(ii) Second group of intervening variables. The numbering of the variables of this group will start with four;

(iii) Third group of intervening variables. The numbering of the variables of this group will start with five;

(iv) Fourth group of intervening variables. The numbering of the variables of this group will start with six;

(v) Fifth group intervening variables. The numbering of the variables of this group will start with seven;

(d) Sixth group intervening variables (efficiency and effectiveness variables). The numbering of this group of variables will start with eight;

(e) End-result variable is the outcome of the system, and as stated earlier and illustrated in Fig. 9, it is the system performance. The numbering of this variable will start with nine.
Fig. 9 The Casual Format of the Study
Chapter 4: The Organization of Training, Development and Selection Subsystem and its Affect on Human Resource Management

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4.3 Training Philosophies
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CHAPTER 4

THE ORGANIZATION OF SELECTION AND TRAINING, DEVELOPMENT SUBSYSTEM AND ITS AFFECT ON HUMAN RESOURCES MANAGEMENT

4.1 Introduction

The first project Managerial Subsystem, as illustrated in Fig. 8, focuses on the Organization of the Training and Development subsystem. The call for training, development and selection activities to be closely integrated and directed towards helping to improve system performance of the project (Cost, Time, Quality and safety) would suggest that the construction should have committed extensive resources to training and recruitment. An essential component in the development of the labour of the industry is the deployment of the labour force which constitutes a direct component. Whereas in the past training may have been regarded by some organizations as a luxury, there is now a widespread acknowledgment by both academic and commercial organizations of its importance to the success of the business. This recognition largely stems from globalization, and the related intensification of overseas competition in recent years. It has not gone unnoticed that those countries whose economies have performed well in recent years, such as Germany and Japan, have emphasized the importance of training (Holden, 1997). This is also reflected at the industry level where those industries which invest in training tend to perform better, and have a more positive public image than those which do not (Martin et al., 2003).

This subsequently influences the quality of new recruits to an industry, which in turn aggravates the problem, leading to skills shortages and deficient performance in terms of product quality and delivery efficiency. Indeed, concerns over the quality of recruits to the construction industry have been a major problem in recent years, and this has led to a range of training initiatives. In essence, training represents the mechanism by which organization invests in the intellectual capital of their workforce, and it lies at the very heart of achieving a vibrant, healthy, motivated, happy, and efficient organization culture.

Training and development are the basic components of the Human Resource Management (HRM). The object of training is to alter the behaviour of employees in a way that will create improvement in the achievement of organizational goals. In this chapter, the emergence of the concept of HRM is firstly tackled, then are human resource concepts
and ideas. After that training and selection at a project level will be explored, then motivation subsystems in Chapter 5. The environmental forces and the organizational structural subsystem affecting the organization will tackle in Chapter 6. Chapter 7 will tackle the other subsystems that affecting the organization.

4.2 Emergence of the Concept (Human Resource Management, HRM)

Human resources management (HRM) is the part of management that deals with administration and welfare of the human resources. It can be regarded as the agent for implementing organizational strategies that are set by its leaders. Hence, the personal function becomes as an important part of practicing in construction organizations as the marketing and finance functions.

The concept of human capital is central to any consideration of development, and an incorporated factor previously ignored by classical economic category of labor. The so-called economically active population was no longer regarded as a uniform potential work force, but rather as a reservoir of differentiated skills incorporating educational investment and work experience.
Human resource interpretation of the development process arose in the 1960s as a result of earlier studies on the importance of educational investment for the formation of "human capital," and in particular, on its impact on the economic development of some industrialized countries. The recognition of the long-term importance of educational investment added an awareness of the increasing complexity of productive structures from the industrial revolution onward. This phenomenon was experienced not only by developed countries, but also in many so-called "underdeveloped" ones-albeit to lesser extent- with the concomitant increasing diversification of their educational systems. Educational investment and the role of the human factor are fundamental to the productive process. Basically, the idea of human resources was a historical extension of the category labor fundamental to the discipline of economics. The founders of economics determined the place and importance of work, incorporating it in all theories of production. From
William Petty to Ricardo and Marx, the theory of value was based on labor. Since then, the idea of "labor" as a notion has been a crucial, although by no means the single, aspect of all economic and social analysis.

According to the ILO (1989, p. 21), the overall goal of global economy should be to provide opportunities for all people with freedom, equity, security and human dignity. This requires the attainment of four strategic objectives that are vital to social progress: employment creation, increased and effective investment in human resources development, provision of learning and training opportunities, competitiveness, growth, and social inclusion of all, promoting human rights at work, improving social protection and promoting social dialogue. However, the problems and challenges facing organizations today in the area of human resources management are manifold. They are found in selection, promotion, appraisal, compensation, training and development, labor relation, job design, productivity and many other areas (Fig. 10). The environmental extend to the firm plays a significant role in determining the options available in handling the human resources problem. For this point the study takes an "open system" viewpoint in the treatment of human resource management. It shall provide a framework (Fig. 11) for identifying some of the major factors that affect personnel management. These factors include managerial philosophy, employee values, technology, government pressures, market condition, and labor union pressures. The first three factors are primarily internal, while the last three-factor are derived from outside the firm.

A Managerial philosophy, Miles (1975, pp. 31-50) provide a categorization. The Philosophies of most managers fall into three broad categories: Traditional, Human Relation, and Human Resources. Traditional managers are most concern with production efficiency and accomplishment of tasks goals. Human Resources philosophy emerged out of the realization by some managers that the traditional approach was not entirely successful in their situation. Studies were conducted the by Mayo and his assistants at the Hawthorne plant in the late 1920 and 1930. The studies led to the belief that management must concerns itself with social and psychological needs of employees. It was assumed that satisfying their needs would cause them to be more productive.
The human resource philosophy assumes that the most realistic work situation is achieved by recognizing a trade off between the employee and the firm. Human Resources view differs from other managerial philosophies in its focus on developing and using the full talents and abilities of employees.

A second major internal constraint on human resource management is the employee. Each employee brings to the job a particular set of needs, values, attitudes and exceptions, often based upon past experiences. Technology is the third internal force that determines the options available for the people responsible for human resources management in the firm. Porter et al., (1975 p. 233) define technology as:

“The techniques used by an organization in work flow activities to transform inputs into outputs”.

**Fig.11 Internal and External Factors Influencing Human Resource Management (Richard et al., 1979 p. 22)**
Technology becomes a constraint when a desirable job design cannot be carried out because of inability to adapt existing technical means to the new design.

4.3 Training Philosophies

Although many countries may have a training policy statement and even more specifically programmes regarding to the construction industry the beliefs and assumption on which training is based appear in many cases as based on rather generalized and unclear notions. Shaddad (1983) identified a sample of training beliefs that includes:

(a) Training contributes towards an organization success or survival;
(b) Training is an integral part of the organization's overall manpower policies;
(c) Training is provided to meet individual employee needs for growth and development;
(d) Training is part of the change process in the organization;
(e) Training is undertaken primarily in response to pressures imposed by external bodies such as the Construction Industry Training Board (CITB);
(f) Training is seen as a means of maintaining or improving the company's images;
(g) Training is provided as an act of faith, and training perceived as a good thing; and
(h) Training is undertaken for reasons of social responsibility.

The area of training philosophies appears to be one of which has attracted the concern of too few writers on the construction industry. Brech (1971, p. 341, ed. Shaddad, 1983), a former chief executive of the CIBA, states:

"attaining, maintaining, and improving performance, productivity, profitability; that is what management is all about; that is what training is all about."

Pitcher (1981) recommended the avoidance of many of the abstract philosophical theories since construction is essentially a professional and practical subject; define education as the provision of a liberal intellectual training for both professional skills and wider issues of social responsibility. More specifically training will be used to describe the process of imparting a facility in a particular skill by instruction and practice.

4.4 Managerial Aspects and Human Resource as Major Variable Affecting Performance

4.4.1 Managing the Human Resources in the Organization

Organizations operate within dynamic environments, and are affected by both external and internal forces which constantly impact on their competitiveness and ability to profit from their commercial environment (Anthony et al., 1996: 3). Managers must
constantly monitor, review and adapt their business strategies to ensure that they can respond to these forces effectively. Any change in an organization's strategy will demand parallel changes to its structure, processes, physical resources and human resources. Of these factors, the HRM function in particular is crucial for coping with change, as it transcends each of these areas. Loosemore (2003) adds that, for this reason, construction firms of all sizes have to develop flexible and strategic approaches to HRM in order to manage their day-to-day activities effectively. The 1990s has witnessed gradual re-definitions of the HRM function from personnel welfare advisory role to a performance-driven core management activity (Fig. 12).

In essence, proponents of HRM contend that, whereas personnel management is workplace-centered, and therefore directed at employees' needs, HRM is resource-centered and therefore aimed at meeting management's human resource needs. In this context, Legg (1989) suggests that HRM emphasizes the development of the management team (with line management having responsibility for employee-related issues) and has a more strategic emphasis (i.e. is regarded as a senior management activity).
Storey's analysis (1993) draws a distinction between the traditional and contemporary views of the people-management function, and distinguishes HRM as a process, which aligns the needs of the organization and those of the employee. By placing people-management activities at the center of the organizational strategy, it raises the profile and importance of people and human resource managers as a key competitive resource for an organization. Thus, an appropriate definition of HRM could be:

**Fig. 12 Human Resource System Model**

*Porter et al., (1975 p. 233)*

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“A managerial perspective, with theoretical and perspective dimensions, which argues for the need to establish an integrated series of personnel policies consistent with organization strategy, thus ensuring quality of working life, high commitment and performance from employees, and organizational effectiveness and competitive advantage.” (Huczynski and Buchanan 2001:673)

Notably, the function of human resource management is considered a core managerial function rather than a specialist support function, and it is considered a good practice for anyone with managerial responsibility to be involved with employee-management issues (Cornelius, 2001).

A successful organization must harness the efforts of the human resources at its disposal. The greatest challenges for construction organizations are in finding good people and utilizing them to their full potential in a way which contributes to the accomplishment of organizational objectives, or, in other words, managing the talent of the worker within the organization. In order to achieve this they must train and develop, promote, retain and release their staff as appropriate. Loosemore (2003) identifies a process, known as the SHRM (Strategy Human Resource Management) cycle, which was influenced at every stage by an organization's objectives and by external environmental forces.

Employees’ resourcing is concerned with planning for the needs of the organization, defining roles and responsibilities necessary to achieve these goals and then recruiting and selecting the people to fill these roles. HRD is concerned with managing the performance of employees in such a way that they contribute to organizational objectives. This includes training, management development, and the management of structures and career paths to ensure clear succession routes through the organizational hierarchy. Reward management is about defining the wage and benefit structures in a way which responds to the needs and expectations of employees and ensures their commitment to the organization. Together these interrelated activities ensure the supply, development and motivation of employees and their careful management is a prerequisite to achieving the human resource stability necessary for organizational growth and development. In most large organizations they are supported by information and communications technology (ICT) tools known as human resource information systems (HRISs).

4.5 Human Resource Aspects Affecting Performance

4.5.1 Introduction

Human Resource Planning (HRP) can be defined as a management technique for forecasting and selecting the type of employees required achieving specific objectives.
The manner in which human resources management deals with manpower planning depends largely on analyses of the external environment and organizational objectives and needs. Atkinson (1985, p. 266, ed. Naoum, 2001) stated that:

"...under the combined influences of profound economic recession, uncertainty about market growth, technological changes in both product and production methods, and reductions in working time, British employees are beginning to introduce novel and unorthodox working time, formations in their development of labour. They mark a significant break with the conventional... labour markets which dominate manpower management both in theory and in practice. These innovations are intended to secure greater flexibility from the workplace...

The purpose of HRP is the design of 'schemes for the acquisition, development, management, organization, and use of employees, so that, as with any other valued resource, they are deployed as effectively as possible to the achievement of organization goals' (Torrington et al., 1991). Human resource planning is about the integration of all these activities so that they are mutually supportive and in line with the organization's overall mission or philosophy. While traditional manpower planning is about providing the right people with the right skills at the right time, HRP is about wider issues linked to the culture of the organization—such as total quality management, performance management, customer care initiatives, and employment flexibility.

Drucker J. et al. (1996, p. 24), argued that human resource planning covers a number of areas of management activity:
- analyzing and describing jobs and preparing person specifications,
- assessing present and future employment needs,
- forecasting labour supply and demands,
- developing, operating and monitoring procedures for recruiting, selecting, promoting employees or terminating their employment, and,
- ensuring the employment law requirements are adhered to.

4.5.2 Human Resource Planning in Construction Industry

In the construction industry, human resource planning is relatively underdeveloped, yet employment planning is crucial to the successful performance of the construction organization. Four majors' issues characterize the approach of the industry to employment matters: casual labour, high labour turnover, inadequate selection processes and training, and the absence of specialist personnel managers and developed personnel system (Ford et al., 1982). A study in 1978 noted that average levels of labour turnover in construction were roughly twice as high as the national average (Economist Intelligence Unit (EIU),
The improvement of recruitment procedures and the adoption of routine personnel practices is the key to improving performance in the industry.

Agapiou et al. (1995a, Drucker J. (ed.) p. 28) stated that:

"The lack of appropriate data has resulted in very little research directed towards the development of labour supply forecasting models for the construction industry." Much of the data available 'is unintelligible to companies, and instances abound of large projects being located in areas where there is insufficient labour to satisfy the demand generated'.

The major method of dealing with skill shortages in the past has inevitably been to increase pay levels, leading to severe competition between firms and a consequent inflationary surge in labour costs. This leads in turn to a rise in construction prices and a downturn in demand which provides a temporary respite. Other methods of dealing with such shortages- such as the re-design of construction methods (e.g. new technology) or long-term planning training needs- are relatively undeveloped (Agapiou et al., 1995a).

Apart from this general problem of the wastage of trained workers from the industry, current employment planning is complicated by demographic trends (fewer young people to recruit) and the increase in the numbers of young people staying on in education, leaving a substantial shortfall in recruits to the industry. This means that construction firms will have to seek alternative sources of labour (including upgrading existing operatives, attracting more adult retainers etc.), which in turn raises issues about the industry's public image as an employer. Skill shortages vary from region to region, and organization will need to be aware of the labour supply in their own locality, although there is also a tradition of labour mobility between regions.

4.6 The Recruitment and Selection Process

4.6.1 Introduction

The project-based nature of the construction process means that many of the concerns about recruitment and selection occur at the project level. Ensuring a ready supply of the various construction professionals and trades to make up project teams is a vital task. Drucker J. et al., (1996) stated that there is a clear division between the resourcing of operatives on site and the supply of professional and management staff of project teams. In general, the supply of manual labour is carried out by the site manager carrying it with the intervention of the personnel manager. Basic guidelines may be provided by the personnel department on the legal requirements and basic employee records required, but in general the process is relatively informal.
Recruitment and selection have been areas for innovation in organization where there has been a particular attention given to using HRM as a new approach. Research evidence suggests that this is not a major focus for new policies in the construction industry (Drucker J. et al., 1996). Recruitment and selection decisions are more likely to be taken by line managers than in other industries, and in many cases personnel departments have little or no input in recruitment decisions (Bresnan et al., 1985).

Ford et al. (1982) pointed to the underdeveloped nature of on site selection process. Workers were recruited through a 'selection by trial', which meant many workers left sites after short periods. The main reasons for this rapid turnover were attributed to

"worker being engaged for jobs which they have no competence (this encouraged by an absence of skill certification among many workers), and a failure to inform workers adequately about the type of work, pay and conditions of employment" (Ford et al. 1982 p.45).

The absence of any systems for establishing the quality and suitability of workers in advance of being hired was seen as a particular area of inefficiency within the industry, because the inflationary effects on costs as recruitment had to be reactivated for each turnover. The use of self-employed labour does not automatically resolve this problem, because self-employed workers may also be unsuitable for the tasks to be taken.

4.6.2 Definition of Recruitment

Recruitment is a set of activities designed to attract a qualified pool of job applicants to an organization. Effective recruiting brings employment opportunities to the attention of persons with abilities and skills appropriate to job specifications. Barber (1998, p.78) defined recruitment by its intent, rather than its effects. He offers the following definitions:

"the set of activities undertaken by the organization for the primary purpose of identifying a desirable group of applicants, attracting them into its employee ranks, and retaining them at least for a short term."

There are two basic categories of job candidates towards whom recruiting efforts can be directed-qualified employees ready for promotion or transfer from within the organization, and persons from the outside. Internal recruitment involves making employees aware of job vacancies through job posting and personnel recommendations. Most organizations have procedures for announcing vacancies through newsletters, bulletin boards, and the like. They also rely on managers to recommend subordinates who are good candidates for advancement. External recruitment involves the attraction of job
candidates from sources outside of the organization. Newspapers, employment agencies, colleges, technical training centers, personal contacts, walks-in, employee referrals, and even persons in competing organizations are among the sources of external recruits.

Each of these recruitment strategies offers potential advantages and disadvantages to the organization. Internal recruitment is usually the least expensive, dealing with a person of known performance record, and leads to a pool of candidates who are already familiar with the internal workings of the organization. A history of serious internal recruitment can be very encouraging to employees. It demonstrates opportunities to advance in one's career by working hard and achieving high performance at each point of responsibility.

Drucker J. et al. (1998) identifies the main stages in the recruitment process as follows:
- analyzing the labour requirements (job analysis, job descriptions, person specifications, establishing criteria for selection, etc.)
- attracting applicants (internal and external markets, recruitment advertising, source of applicants, etc.)
- assessing the candidates (application forms, curricula vita, short listing, etc.)
- selecting the right candidate (interviews, group selection methods, psychology/personality testing, assessment criteria, etc.)
- Final assessment and placement (reference and induction recruitment administration).

4.6.3 Recruitment Source Research

The effectiveness of different recruitment sources for new employees has been the topic of speculation and research for over 50 years. Effectiveness has been assessed by examining turnover/job survival rates and job performance. As reported by Zotolli (2000) in most narratives reviews and all five quantitative reviews, referrals by current personnel, in-house job postings, and the rehiring of former employees are the most effective sources. Walk-ins have been slightly less effective, and the least effective sources are newspaper ads, school placement services, and employment agencies (government/private).

The earliest research and writing about recruitment sources were concerned with how individuals searched for job openings (e.g. Myers & MacLaurin, 1943). Much of this early research disconfirmed economic theory at that time, assuming that people were well informed about job openings and made rational job choices. This challenge to classical
economic assumptions about job search and job choice came from a widely cited literature review that concluded that individuals were largely ignorant of job openings. Further, the typical search for job openings was often limited to one's friends, relatives, or acquaintances (Parnes, 1954).

Starting in the 1980s, the primary research emphasis shifted to the on-the-job effectiveness of employees who were hired from different sources. During this period, two other issues emerged, but they have received much attention compared to recruiting sources. These two issues are:

(a) the number of qualified job applicants obtained from different sources (sometimes called "source yield") and

(b) demographic differences (sex and race) among applicants from different sources.

Because most of the research on recruiting sources has been conducted on differences in new recruit on-the-job effectiveness, it is the focus of the present review.

4.6.4 The Affect of Recruitment Method on Effectiveness

Zotolli et al. (2000, p.353) have suggested a number of effectiveness criteria including turnover/job survival rates, length of time employed, intention to quit, job satisfaction, organizational commitment, absenteeism/attendance, and job performance. This is one type of inconsistency noted by reviewers which has been used to assess on-the-job effectiveness of new hires. The other second type of inconsistency is the number of sources used in a particular study. Recruiting sources that have been studied include referrals (by friends, relatives, or employees), rehires, internal job postings, walk-ins, employment agencies, and advertisement. The third type of inconsistency is the type of job studied (permanent vs. seasonal hires etc.). This difference makes comparison between studies difficult, because measures of on-the-job effectiveness can vary widely. A fourth inconsistency is that the sample sizes vary dramatically among studies, from less than 100 persons to thousands of employees. This can be particularly troublesome if the large sample size studies have something in common that makes them somewhat different from other studies, because most quantitative reviewers use sample size weighting in their calculations of recruitment source effects.

Meta-analysis offers some hope for resolving the concerns with these inconsistencies. In particular, the attribution of between-studies variance in effect sizes to sampling error is an important aspect of meta-analysis. Five quantitative reviews, three of which are Meta-analyses, reported calculations of the average relationship between
different recruitment sources and measures of employee effectiveness at work. All five of these quantitative reviews consistently concluded that certain recruiting sources are more effective than others. The first quantitative review to be conducted was Conard and Ashworth's (1986) unpublished, but widely cited, meta-analysis of 10 effect sizes from seven different studies. They reported an average job survival rate for the following recruitment sources: employee referrals (61.5%), employment agencies (48.4%), advertisements (44.8%), and walk-ins (58.4%). The second quantitative review was conducted by Aamodt and Carr (1988) and utilized non-traditional methods for cumulating the data in order to include more studies. The results of their quantitative review found recruitment source differences for tenure, with employee referrals having the longest tenure (120.36) followed by walks-ins (98.89), employment agencies (91.5), and ads (88.92). The third of the five quantitative reviews was done several years later by Wanous (1992) who found five additional studies increasing the total number of studies of job survival/turnover from 7 to 12 and the number of effect sizes from 10 to 15. Wanous reported that job survival rate for inside sources (group composed of referrals and re-hires) averaged 24% higher, compared to outside sources (groups composed of agencies and advertisements), when the studies were sample-size weighted. When the studies were unit-weighted (to discount the distorting effect of three large-sample studies on the overall average), the average is 36% higher. The fourth quantitative review (Thorsteinson, 1998) used the Hunter and Schmidt (1990) meta-analysis techniques to assess the differences in effectiveness between formal and informal sources. There are six hypotheses about the effectiveness of inside/informal sources:

1- Ullman (1966) hypothesized that 'informal' source, had lower attrition than 'formal' sources, because of the 'pre-screening' effect.

2- Hill (1970), argued that the better performance of referrals was a result of two effects: (a) realistic information communicated to the candidates helped that person make a better job choice decision, and (b) those that refer job candidates are in a good position to assess who will be a good match with the organization.

3- Reid (1972), suggested that employee referrals have a greater amount of pre-hire information, and that the information is more accurate.

4- Decker and Cornelius (1979), speculated that individuals recruited by newspaper ads or employment agencies might be more prone to quit because they were aware of more job possibilities.
5- Schwab (1982) speculated that applicants from different sources might represent different populations of job candidates.

6- Skolnik (1987) echoed Breaugh's (1981) belief that individuals recruited through different sources might be treated differently once on the job, thus leading to the observed recruitment source differences.

The studies reviewed do not provide a clear consensus as to which explanation for recruitment source effectiveness is most credible. Most of the studies failed to conduct proper tests of mediation. Even those that did do so often reached different conclusions. Despite decades of academic research on the inferiority of newspaper ads compared to referrals, rehires, and even walks-ins, many human resources practitioners continue to believe that ads are the most effective sources of new recruits at lower/entry level positions (Society of Human Resource/CCH, 1999).

4.6.5 Definition of Selection

Having identified a list of suitable candidates for a position, the critical task becomes the selection process. Loosemore et al. (2003, p.91) state that:

"Selection is the task of deciding which people best suit the current and future needs of an organization and offering them a position."

Unfortunately there is no way to know for certain how a person will perform in a position, in many companies, including those in construction. The process is no more than a lottery (Cooper and Roberston, 1995). However psychologists have developed a variety of methods for attempting to measure a candidate's suitability. Although sophisticated selection systems which focus on a range of criteria have been developed in construction, most selection processes remain unscientific (Drucker J. et al. 1996). Whilst most companies have begun to use psychometric tests, assessment centers and behavioral event interviews, such practices are not widespread. In many cases projects are staffed on the basis of availability alone, and subcontractors are normally employed on the basis of price (after pre-qualifying). This is despite considerable evidence that team structure has a significant influence on organizational success (Barbara, 1997) and that personality can influence people's ability to cope with work demands (Dolan, 1995).

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(1) These include interviews, peer assessment, astronomy, graphology (analysis of handwriting), bio-data analysis, personality tests, trials, etc. whichever the technique is used, the aim is the same- to measure the degree of fit between the 'gap' in the organization which needs filling for the achievement of its goals, and the capabilities and interests of the candidate.
4.6.6 Recruitment and Selection in Construction Industry

Recruitment as mentioned before is the process by which managers attempt to fill positions identified. Loosemore et al. (2003) argued that this was often a problematical process in construction projects, even in times of high unemployment, since both applicants and advertisers have specific needs and exceptions that will have to be matched.

The operative labour force in construction industry is divided into roughly two halves- the craftsman and laborers, though in practice there are substantial intermediate occupational groups of specialists, plant operators, etc. Recruitment to the labour force in the U.K. follows the formal division of the industry and is broadly divided in two groups: those recruited as apprentices, generally soon after leaving school, and those recruited as labour that generally enter the industry a few years after leaving the school. Shaddad (1983, p.220) stated that: "it is widely believed that the construction industry is failing to attract young people of sufficiently high caliber".

O’Brien, J. et al. (1981), done a study in fifty-three areas in all parts of the United Kingdom, consulted the Youth Employment Officers upon the attitudes of boys to each of the main crafts, indicated that:

1. those which are the most popular and enjoy the highest status are either trades which are not confined to construction- electricians, carpenters, joiners- or those most akin to engineering-electrician, heating and ventilating engineers.
2. the traditional building crafts have a comparatively low status. They are not regarded as demanding any great skill and some of them likely to become obsolete through the introduction of new methods.

Recruitment can take place either internally or externally. With changes in the structure of construction companies away from directly employee labour, most recruitment for projects is of an external nature and normally revolves around competitive bidding process for specific work packages by subcontractors. Internal recruitment tends to be restricted to managerial and administrative support functions, although with the growth of part-time contracting professional staff the distinction between internal and external employees is becoming more blurred. Internal recruitment has several advantages over external recruitment. For example, it is considerably cheaper and quicker, particularly in case of searching for a manager. Internal recruits know how the organization works, and

(2) Loosemore et al. (2003) add that on average, contractors now provide only around 25% of their employees with steady
can enter a new job without having to suffer a costly and delaying learning curve. Also it provides a motivating force for the existing workforce by providing opportunities for progression within the firm. However, on the negative side internal recruitment starves an organization of the opportunities to expand its experience and expertise base. Since adaptability will be the key to future property. This is one important warning against the long-term use of partnering as a procurement practice. The freshness of ideas which variety, change and conflict bring is as important in construction projects as it is in any company. For external recruitment, as mentioned before, using a direct advertising, recruitment agencies or informal means, such as word of mouth and approaches to suitable candidate.

Most of the site recruitment is carried out by project or site manager who decides the labour requirements for each stage of the construction process, and has to plan the order in which events take place. Many construction sites only have one or two contractors permanently present: usually a project manager and possibly a general foreman depending on the size of the job. Larger sites may have a site manager and a site agent (Drucker J. and White 1996). Because of the way the industry secures its work, continuity of employment becomes difficult to guarantee. Loosemore et al. (2003) insist that contractors are looking to minimize fixed costs as much as possible. As a result, firms end up appointing different people on various projects. Here, the majority of workers that are appointed in building sites are appointed on a trial and error basis, which makes the satisfactory level of performance of any individual highly dependent on chance.

However, some large companies realize the importance of employing operatives, especially skilled labour, on a permanent basis and try to use the same teams on a series of contracts. The degree to which construction operatives remain in the employment of a single contractor over a period of time depends largely on the type of labour market in which the operatives work. At site level, informal methods of recruitment predominate in construction, largely because of the propensity for site based line managers to manage recruitment to their own projects (Drucker J. and White 1996a). This also extends to senior positions where companies may identify managers and professionals working for rival companies, where they entice them to join them with monetary rewards and other incentives. Due to lower percentages of boys recruited in the construction comparable with other industries, and is indicative of the limited extent to which positive employment policies have been developed in construction.
Goff, K.A. et al. (1987) suggested that the following majors’ factors should be considered if a competent, satisfactory workforce is to be recruited:

1. improvement in conditions of employment: this concerns the degree of casual employment, the likelihood of redundancy or short time during the winter and economic recessions, and unpleasant working conditions;

2. status and prospects: recent research indicated that these factors found within the industry fall considerably short of the aspiration of the operatives. Such factors include a suspicion that many of the crafts have been deskilled or about to become obsolete, that the industry is technologically backward, that opportunities for promotion are limited and so on.

Unless the industry acts now to improve its public image in relation to conditions of work, status, and prospects, the situation as regards recruitment could become very serious and have a devastating effect on the system performance of construction projects. The factors, which attract recruits in the construction industry, are the level of craft wages, and the long-term employment, the other 75% are, to varying degree, 'causal' prospects of the industry (Agapiou et al. 1995a). If the industry's images are one of insecurity, low pay, low status, poor career prospects, and dirty and dangerous working conditions, it is not likely to attract potential employees.

4.7 Human Resource Development

4.7.1 Introduction

Human resources development (HRD) and training play a major, if not decisive, role in promoting economic growth with equity; they benefit individuals, enterprises, the economy and the society at large; and they make labour markets function better. It is often said that an organization is only good as its people. Organizations of all types and sizes have one thing in common: they share the common challenge to employ competent and motivated workers. Human Resource Development (HRD) can be defined by Harris (1994, p.2) as:

"a set of systematic and planned activities designed by an organization to provide its members within the necessary skills to meet current and future job demands".

HRD programs must respond to job changes and integrate the long-term plans and strategies of the organization in order to insure efficient and effective use of resources. People are common elements in every organization. They create innovations for which organizations are noted. Viewed from the perspective of the organization, people are resources-not inanimate resources, like land or capital, but human resources. As a slogan
at one Union Carbide plant puts it "Assets make things possible, people make things happen." It is people who produce a nation's valued products and service. And these valued outputs determine a society's well being and its standard of living. Debates (1982, p.332) argued that:

"People and organizations depend on each other. This mutual dependence among individuals, organization, and society is almost certain to grow."

Therefore, the central challenge facing our society is the continued improvement of our organizations; both private and public organizations improve through more effective and efficient use of their resource. ‘Effective’ means producing the right goods and services socially deemed appropriate. ‘Efficient’ means must use the minimum amount of resources needed to produce goods and service. The result of this is an improvement in industry's productivity. Productivity defined by Werther et al. (1982 pp. 3-5)

"is the ratio of an organization's outputs (goods and services) to its inputs (people, capital, materials and energy)".

HRD contributes to productivity improvement and directly by finding better and more efficient ways to meet their objectives and directly by improving the quality of work life of employers. Druker J. (1981 p. 37) argued that: “human resources development and training underpin the fundamental values of society-equity, justice, gender equality, non-discrimination, social responsibilities and participation of all economic and social life.” (1)

Werther (1982) identified the main objectives of the human resource management are:

1- Societal objective. To be socially responsible to the needs and challenges of society while minimizing the negative impact of such demands upon the organization. The failure of organizations to use their resources for the society's benefit may result in restrictions.

2- Organizational objective. To recognize that human resource management exists to contribute to organizational effectiveness.

3- Functional objective. To maintain the department's contribution at a level appropriate to the organization's needs. (3)

(1) McFarland (1960) defines several concepts used in the development of human resources. Although training and education are closely connected these concepts differ in crucial ways. While the term training relates to imparting specific objectives the term education involves the development of the whole individual socially, intellectually and physical. Accordingly, training forms only a part of the entire educational process. Moreover education is more akin to the concepts of growth and development than training. The term development can be defined as the nature and direction of change taking place among personnel through educational and training process. The relatives' amount of training and education changes with the nature of tasks and responsibilities in organizational settings. As one goes upward the organization, the amount of training usually decline and the amount of education enhances. Dunn and Stephens (1972) do not limit the term development to managerial personnel only. According to them training refers to the organization's effort
4- Personal objective. To assist employees in achieving their personnel goals, at least insofar as these goals enhance the individual's contribution to the organization. Personal objectives of employees must be met if workers are to be maintained, retained, and motivated (Frederick, 1988 ch.2).

ILO's report (1998) stated that:

"It's understood that (HRD) and training are to be the activities of education, initial training, continuous training, and live long learning that develop and maintain individuals employability and productivity over a life time. While education and initial training provide the foundation of individuals' employability, continuous training and lifelong learning give them the means to maintain it over their working lives."

Human Resource Development (HRD) and training improves their prospects of finding and retaining a job; improve their productivity at work, their income-earning capacity, and their living standards; and widens their career choices and opportunities. By developing workers capabilities to pursue collective and individual interests, education and training foster an environment that is conducive to economic and political democracy. They are also tools for developing the new social skills, competencies and attitudes, and tolerance and solidarity that are needed for economic, social and political participation in an increasingly integrated and mobile world. Finally, education and training are indispensable for individuals to live in a knowledgeable, communications and technological society.

4.7.2 The Role of Human Resources Development (HRD) in Construction Industry

Most construction industries around the world are characterized by unstable levels of activity (Rosenfeld and Warszawaski, 1993). This was compounded by inadequate investment plans and changing government priorities due to various sociological, economical, and political constraints inherent in developing countries. Liberalization of the economy has led to emergence of more small contractors, competition then increased, self-employment and subcontractors diminished, major contractors shed most of their workforce and in-house training declined. These phenomena also exist in developed countries (Agapiou et al. 1995a).
Today, many construction workers are hired on a project basis and made redundant on project completion. As a result, the construction industry in most developing counties is characterized by a pool of local labour who works for a variety of contractors in different branches of the industry, such as industrial, residential, non-residential and heavy construction (Uwakweh and Maloney, 1991). Contractors will employ workers from the local labour pool, and when it is no longer required that will make workers redundant and force them to return to the labour pool. In the absence of the human resource planning and development, the size of the local labour pool fluctuates, causing shortages and surplus.

This is the situation in most developing economies for the reasons previously mentioned, and hence human resource planning and training can no longer be expected from contractors. Construction, being one of the most important industries in any country, particularly in developing countries, requires the HRD aspects to be addressed by a central body directly responsible to the government or a body consisting of interested parties. These mechanisms exist in developed countries. For example, training requirements of the U.K. construction industry are partially regulated by the Construction Industry Training Board (CITB) (Agapiou et al. 1995a) and in the U.S.A are controlled by the Bureau of Labor Statistics through its construction labour demand system (Uwakweh and Maloney, 1991). Moreover, there have been attempts to produce forecasting models, be it for supply (Greer and Armstrong, 1980; Hooper and Catalanello, 1981), or demand of labour (US Department of Labour (USDL), 1970, Walker, 1980; Rosenfeld and Warszawski, 1993; Agapiou et al., 1995b; Tang et al., 1990) or even for diagnosis of manpower problems (Fyfe, 1891). HRD represents the development side of the human resource management (HRM) function in assessing and improving individual performance, managing careers and in providing organizational management development. However, for construction companies, the susceptibility of the industry to economic fluctuations makes the applicability of many of the established aspects of the HRM questionable (Bresnen et al. 1985; Huang et al. 1996). This is because the inherent variability in the construction product and location, the autonomy of operational managers at project level, and the need to cope with unexpected change set in place a problematic framework for the management of the employment relationship (Druker J. et al. 1996a). This may explain the apparent under-utilization of HRD within the sector, which is demonstrated by the positions of its HR managers. Only 28% occupy a broad position compared with 54% in other sector companies (Druker et al. 1996). This effectively defines HRM as a second-order function.
Evidence of the under-utilization of HRD mechanisms within the sector is well supported within the literature. Hancock et al. (1996) found that whilst large construction companies generally understood the concepts of HRD, only around half of them actually practiced it. Young (1988) found that 75% of construction companies had no career development policy to allow the individual to compare their personal career needs with those of the organization, and Mphake (1989) found that only 17% of large construction companies had formal management development policies.

This traditional under-reliance on HRD reflects the industry's reliance on 'hard' systems approaches or those commonly attributed to 'personnel management practices', where employees are viewed as any other factor of production whose cost should be minimized (Druker et al. 1996). However, despite the problems that industry faces in implementing effective HRM policies, if employers are to avoid losing their best staff to their competitors, they must develop more effective tools in the future (Druker & White, 1996b). This requires employers to meet individual employee careers needs and expectations, not just in terms of formal employment contacts but also in terms of their employees' informal expectations of the relationship between themselves and their employer.

Whilst formal employment contracts can define many aspects of the employee-employer relationship, they cannot delineate every aspect; thus, socially constructed expectations and obligations fill the gaps that are left (Martin et al. 1999). These less formal expectations are known within the HRM literature as psychological contracts, which describe the beliefs of each of the parties in relation to their mutual obligations within the employment relationship (Herriot, 1998). Acknowledging the existence of psychological contracts is important in terms of understanding employee relations, as it allows employment contacts to be seen as a two-way exchange process rather than simply as being imposed by employers (Herriot & Pemberton 1997). Within the defined relationship the psychological contract, both the employer and the employee inform, negotiate, monitor and then either re-negotiate or exit the employment relationship. As such, psychological contracts represent a reciprocal and a dynamic deal which evolves as the employer's commitment changes (Sparrow & Machiton, 1998). According to Rousseau (1995), the content of psychological contracts (long-term, open-ended relationships within unitary organization, which lead to the exchange of loyalty, trust, and support) and transactional
contracts (short-term relationships set in pluralistic organizational contexts and characterized by mutual self-interest). Regardless of where psychological contracts fit within this continuum, they should be seen as both interactive and dynamic (Herriot & Pemberton, 1996). Employers should not assume that they would remain static in the context of continually changing employment relationships.

The implication of acknowledging the existence of psychological contract for organizations is that, in addition to the 'hard' areas of the employment contract that must be met, a 'soft' set of expectations held by the individual must also be organized and managed (Spraw, 1998). This is necessary because a breach or violation of the psychological contract can have serious implications for an employee relation. (1)

The nature of organization and involvement climates are significant antecedents to positive psychological contracts (Guest & Conway, 1997), as are promises and expectations on career development and job security (Martin et al. 1999). However, considering the apparent under-utilization of the HRD functions within the construction industry, it seems reasonable to hypothesize that an incongruity may exist between organizational policy and the career needs of the individual. If this is the case, then it might explain why employees seek to develop their careers within competitor companies or even outside of the sector. Little research has explored either employee relations within the construction sector or the nature of individual employee expectations of the employment relationship.

4.7.3 The Development of Human Resources in Construction Industry

As mentioned before in the above definition of the construction industry inputs are utilization of human resources, natural resources and economic resources, which are the major factors of production. The construction process consists mainly of the assembly on site of large number and variety of building materials and components. The industry labour content is also high, like in other similar large-scale assembly operations.

The variety of materials and components used in the construction implies corresponding variety of techniques and procedures for their assembly.

This is reflected in the great number of skill development seen as a direct means of increasing the productivity. As construction is a labor-intensive industry it employs more
than 10% of a nation’s total male \(^{(4)}\) working population. Moreover, the labor component comprises the greatest risk in a contractor's cost estimate and success. Consequently the impact of labor productivity on the result of a project can vary significantly the thing that underlines the importance of proper management of human resources.

Callahan (1984) points that labor productivity in construction is declining, and attributes this primarily to management inability to provide necessary tools, materials and instruction. Labors' motivation and productivity are influenced by a variety of interrelated factors. Important factors include conditions of work, organization, and management of the worksite, use of incentives schemes, availability of good tools and light equipment, and effective communication between the workers at the various management levels.

Hatchett (1982, p. 2-15) stated that:

"Craft skill development has been seen as a direct means of increasing the productivity of a labor-intensive industry." He also argued that: "There are three broad avenues down which craft skills have been developed within the construction industry. The classics formal route is via apprenticeship."

Craft apprenticeship within the industry has had a long tradition and consequently it has developed certain entrenched characteristics. Apprenticeships have become historically linked with the initial entry of young people to a limited number of manual occupations. Traditional patterns of behavior have been developed in association with work experience, industrial training and further education provisions considered appropriate to new entrants to the industry. Attitudes have been formed regarding the occupational status and industrial commitment that should result from the craft apprenticeship system.

Contrary to the general view expressed by Ryrie and Weir (1978), the building industry in G.B. does not use its apprenticeship system as a means of regulating or controlling entry into the craft. Apprenticeship retained the concept of exclusiveness emphasized by Singer and Macdonald (1970) and by Liepmann (1960), who saw apprenticeship as an implied promise of admission to a protected occupation. The skilled trades have traditionally been the basic units of labor process. The concept of a labor

\(^{(4)}\) A breach of a psychological contract defined as a situation in which the employee sees their organization as having failed to meet one or more of their obligations. A violation of the psychological contract, however, infers that the employee may feel frustration, anger and/or resentment, which can lead to deterioration in trust relations (Robinson & Roussseau, 1994; Reicchers et al., 1997). Consequently, understanding the psychological contract and the obligations that employees see, is being owed to them by their employers is fundamental in understanding the causal factors behind employee turnover.
aristocracy, described by Hobsbawn (1964) and Goldthorpe and Hope (1972), has demonstrated that the notion of prestige is essential to traditional beliefs and values. It has been argued by Johnson (1972) that the emergence of specialized occupational skills has created social and economic dependence and social distance. However, the actual degree of skill or knowledge used by an individual at any one time may make adolescents take apprenticeships and theoretically emerge as craftsmen, although much of the work they are given to do would be regarded by many as semi-skilled, as expressed by Parker (1972).

Finally, the construction industry's employment pattern is still characterized by a high turnover of operatives, large variations in wage levels and longer hours of working than other comparable industries- problems of immediate concern for the building operative. Whereas remarks to such problems involve more substantial changes in the industry than improvement in training and access to training, the type of training received and the content reflect and reinforce the dynamics between labor and capital and between large and small capital in the industry.

4.7.4 Strategies in Skill Supply in Construction Industry

The nature and product delivered by the construction industry and the manner in which the building team is formed make the selection process of people rather different from other industries. In construction, there is a clear distinction between the resource of operating on site and the appointment of professional and management staff at the organizational level. This division implies that there is a need for long-term planning at the organizational level and short-term planning at site level.

Short-term planning is concerned with the day-to-day acquisition and recruitment of manpower at site level (e.g. bricklayers and carpenters). Site recruitment is usually decentralized, and is done by the project manager or the site manager. However, with large projects, manpower planning is usually done in consultation with the personal manager at organizational level. Long-term planning is concerned with working out a strategic plan for acquiring and utilizing human resources at the organizational level (mainly skilled labour, experts, professionals, and managers). It is very much linked with organizational objectives and structure, and forms part of the firm's corporate planning. In construction, manpower planning is usually done by the personnel manager who acts in consultation with and takes advice from line managers and project managers. Pratt and
Bennett (1985, Naoum (ed.) p.268) listed seven interrelated areas of activity or 'steps' towards creating a 'manpower plan'. (5)

The key factors which attract recruits to the construction industry are the levels of craft wages and the long-term prospects of the industry (Agapiou et al. 1995b). However, young people's (and perhaps more significant, their parents') perceptions of the industry are also important. If the industry's image is one of insecurity, low pay, low status, poor career prospects, and dirty and dangerous working conditions, it is not likely to attract potential employees.

Several training and recruitment strategies have been identified as necessary for the industry if it is to achieve a sufficient supply of skilled site labour in the future. These include (Agapiou et al. 1995a):

- upgrading the skills of the existing workforce through retraining of craft and operative workers.
- creating a more positive public image for the industry to attract school-leavers,
- recruiting more women and ethnic minority trainees.
- attracting adult workers who have left construction back into the industry for retraining in modern skills.
- recruiting the long-term unemployed and training them in modern skills, and

The composition of the direct workforce in any particular firm depends fundamentally on the types of work which are regularly undertaken. A larger contractor with a varied workload may retain a mix of trades, whereas a specialist sub-contractor may concentrate on one only.

The operative workforce has been a diminishing pool within individual firms in recent years, but perhaps for that reason those who are still employed have a particular importance which could be more effectively acknowledged. Direct employed operatives may find opportunities for internal progression within their organization. This has been a tradition of upward mobility within the company—from trades-men through to charge hand and to foremen—and many senior managers say that they are looking out for good foreman

(5) (a) Manpower objectives as part of the corporate plan,
(b) Manpower audit (external),
(c) Manpower audit (internal),
(d) Supply forecasting,
(e) Demand forecasting,
(f) Implementing,
(g) Control.
for the future. Yet, it may be that some of the traditional avenues of progression have been restricted as companies seek to recruit their junior managers from the ranks of graduates rather than those who have been working as tradesmen. A review of the rewards and benefits of employment as a well as of opportunities for training and career progression, is a necessary part of the move for individual firms, from survival to consolidation.

4.7.5 Self-Employment in Construction Industry

The planning of craft and operative requirements in construction is normally part of the project-planning stage. Labour needs are normally estimated by the project-planning team. However, although labour requirements can be estimated, deficiencies in record may make the estimate of labour more difficult (Fryer, 1990).

Ultimately, construction firms are competing for skilled labour- whether within national labour markets for such categories as professional managers, technical staffs and foremen, or in local or regional labour markets serving recruitment needs for charge hands, operatives, clerical workers and labour markets, is in reality rather blurred, particularly where high labour demand in one area is contrasted with a slack in another.

Self-employment grows significantly during the last years, and the balance between direct labour, direct employment, and self-employment in the private sector has been reversed. The majority of the workforce in construction is now described as 'self-employed', while minorities of operatives in the private sectors are recognized as 'employees'.

The growth of new forms of contractual relationship between the client and contractor, with the development of management fee contracting, construction management, and technique such as design and build, have been accompanied by a new relation between the main management contractor and the workforce, mediated by the process of sub-contracting.

It is sub-contractors who take the major part in managing the human resource planning process. In periods of more intensive activity, self employment and labour-only sub-contracting have led to even more labour turnover on site as gangs of workers move from site to site to wherever the pay is highest (Beardsworth et al. 1988). In this sense, the development of self-employment may not have improved the levels of labour turnover within the industry. The use of self-employment labour is most common in the building trades, where labour-only sub-contracting is extensive, whereas by contrast in electrical
contracting, direct employment remains more common although self-employment has grown significantly over the last decades.

Many sub-contractors prefer to engage self-employment labour, believing that they will not then incur the employment costs or the administrative burdens which are feared particularly by small employers. Employers may only need a specialist category of labour for a short period and so, they may argue, it is easier to use self-employed labour rather than employ people directly. Yet, the way in which labour is engaged for the construction trades remains a major issue for the industry and for those who make their living within it.

Druker J. et al. (1996, p. 25) identifies four categories of labour engagement for construction operatives:

- The directly employed: this group comprises those employees who have contract of service with their employers and who are recognized as employees and describe themselves as such.
- The 'in-house' or long-term self-employed who remain with a subcontractor or contractor sometimes for many years.
- The casual self-employed: there are many self-employed worker who moved from job to job and from employer to employer, sometime through the medium of an agency. Casual employment remains 'employment' rather than 'self-employment'.

4.8 Education and Training in Building Industry

Offori (1990) argued that:

"The development and proper deployment of a well-trained and competent workforce is important for the well being of the Construction Industry".

He added that the factors which influence the supply of labour to the industry in a country can be illustrated in Fig. 13 as follows:
Careers in construction industry are unattractive in most countries. For an industry whose products is important for the socio-economic development of every country, and also has political and historical and cultural significance, the lack of self-esteem of the

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**Fig. 13  Factors Influencing the Availability of Manpower in Construction Industry (Ofori, 1990)**

Careers in construction industry are unattractive in most countries. For an industry whose products is important for the socio-economic development of every country, and also has political and historical and cultural significance, the lack of self-esteem of the
workforce is particularly striking. The number of directly productive workers available to the construction industry is, to a large extent, a residual.

The fundamental factors, which affect the size of this residual include: the size of the total population, attitudes to work in consideration to relevant education, and training programmes.

The complexity of many current construction projects is requiring a redirection and focusing of various aspects of performance. Herein lays the need for a careful evaluation of the entire education and training process. There are many individual perspectives on the concept of proper training for each position within the construction process, but most will agree on the requirement to develop and encourage the development of certain abilities so that each individual can perform at the peak of his own capability.

Hall (1959, p. 93) has identified two basic ways or channels by which knowledge and culture are transmitted:

a) Formal methods of learning and knowledge transfer;
b) Informal methods of learning and knowledge transfer.

Brech (1971) added that formal training is broadly confirmed to off-the-job training of apprentices and trainees at technical colleges. Apprenticeship in the United Kingdom for example provides the construction with most of the major craft skills, such as those of carpenters and joiners, plumbers, bricklayers and so on. It is often argued that an apprenticeship takes too long, and the consideration given to reducing the period is welcomed (Brown, P. 1968). However it is far from clear whether such a reduction would affect the quality craftsmanship or not. In fact, there has little research dealing with quality of apprentice training, either on the job or in the classroom. At present, major changes are occurring in the nature of construction work. Nowadays it is a production-oriented industry requiring the minimum of on-site working of materials and an increase in installation and fixing of elements with greater use of mechanical aids and machines. The changes in manpower have led the industry to begin a re-assessment of its occupational structure and the traditional basis of training. Bearing this in mind, makes it all more important for the industry to develop a soundly based education and training programs. When applying such programs, there are indirect outcomes as summarized by Shaddad (1983, p. 226):

1) quality on construction sites is largely determined by the ability and resourcefulness of operatives. In recent years, an increasing concern has been expressed over the standards achieved on construction sites (Bentley, M., 1981). The incidence of major defects in construction work has become a common subject of attention in the media,
Better quality is often quoted as a benefit of improved training methods, (De Simon, 1966);

2) research in U.K. revealed that direct waste of material on site is twice that assumed by contractors. Glueck, (1974) stated that training could reduce waste, increase output, reduce maintenance and improve quality;

3) studies conducted by Levitt and Parker, (1976) indicate that proper training significantly reduces accidents;

4) Pigores and Mayers (1969), stated that dissatisfaction, complaints, absenteeism and turnover can be greatly reduced when employees are so well trained that they experience direct satisfactions associated with a sense of achievement and the knowledge that will develop their inherent capabilities at work;

5) improving the ability of an operator can affect machine utilization by:
   i) avoiding causing machine or plant breakdown by his own efficiency,
   ii) foresee machine or plant breakdown early enough for corrective action to be taken,
   iii) correcting machine or plant breakdown speedily;

6) training can also affect the demand of supervision, improve performance of gang which is affected by work of a trainee, and improve the degree of flexibility or adaptability of the workforce, improve information processing and communication;

7) Strauss and Stayles (1960) stated that training also motivate employees to work harder. Employees who understand their jobs are likely to have higher morale;

8) reduce learning (cycle) time; this is almost the traditional result of improved training methods, (King et al, 1964).

The role of government in training can range from "organizing, financing and running the training facility to encourage and assist the industry to form its own training system" World Bank (1984). The role of central institutions is very important because of the large scale of tasks involved, and also because of the need to coordinate numerous parties for the successful planning and implementation of training programs. The CITA (Construction Industry Training Authority) of Hong Kong introduced long-term strategies that included "upgrading training, and continuing education for in-service construction personal, specialized training course- to ensure sufficient supply of craftsmen and technician and trade testing among construction workers" (CITA, 1994).

Considering the sources of supply of personnel to the Construction Sector at the professional and sub-professional level staffs are usually provided initial formal training at the universities, technical training centers, and the professional institutions. Both formal i.e. the vocational training centers and the non-formal training systems train the craft-operative level personnel. Drucker J. et al. (1996) argued that, while the majority of craft level
training takes place through non-formal methods only, the courses offered in most training
establishment are for new entrant training (both at professional and craft levels), the need
for offering further training and professional development courses is being increasingly
recognized by educators, trainers and HRD professionals, the contribution towards
meeting the need appears to be inadequate. Training capacities both in the formal and the
non-formal systems indicate that masonry and carpentry courses possibly have the lowest
utilization rates with formal training centers for craft level training being fully utilized. The
non-formal process of on-the-job training appears to be the preferred training avenue for
most new entrants. As mentioned before, education is the process of acquiring knowledge,
understanding, and skills for life which are not necessarily related to the performance of a
task or tasks. Training is a process of acquiring knowledge, understanding and skills for
performing a specified tasks or tasks. In a vocational (job) sense, education is about the
personal development of staff (self-improvement) whilst training is about staff gaining
knowledge, understanding and skills to perform a role or tasks in the Organization.
Education is perceived as taking person knowledge beyond the narrow confines of
identified tasks, while training prepares persons for specific roles and tasks but often
includes element which are related to education. Therefore, it appears that it is very
difficult to separate education and training, especially in the construction industry.

In order to consider reasons for an industry to support education and training, Wijeyesekera (1999) state the following reasons: provide sufficient skilled personnel to
meet expansion plans, improve productivity of existing personnel, improve job winning
prospects by having qualified personnel, reduce labour turn over and increase morale,
reduce accidents and improve safety methods, replace those retiring, add to industry's
stock of skilled man-power, give opportunities to young people to learn and train, provide
opportunities for handicapped people, provide employment opportunities to ethnic minority
groups, provide opportunities for the rehabilitation of offenders, prepare employees for
retirement, prepare persons to undertake overseas job opportunities, and supporting
training for unemployment persons.

Most training is aimed at increasing the abilities and skills of personnel and leads to
expectations that the industry will be more effective and productive. A trained bricklayer is
likely to be more productive than an untrained one unless of course the latter is very
experienced. Training should shorten the learning time for a particular skill by being paced
and organized to deal with essential elements in the step-by-step or logical ways. An
investigation into the causes of low rates of production might reveal that a major cause is
lack of skill by those carrying out the tasks. Further investigations could additionally reveal that the skills of those involved are generally too low, or alternatively inadequate to undertake a particular task. It can be very difficult for a person to accept that they have not got the skills to meet the production requirements. This particularly true if a person concerned have been previously trained or have a great deal of experience. Training which is directly linked to measurable increase in productivity may have to be negotiated in the context of rewards, incentives, and new conditions of service for completing the training.

4.9 Education and Training Activities

It is only in recent years that training literature and thinking has broadened the scope of training from individual oriented and basically educational approaches into channels in which the emphasis is on the gearing of training to contribute towards the achievement of organizational goals. ILO report (1998) state that:

"Training can be defined as the systematic preparation of individuals to improve their capacity to perform market and socially valued functions, i.e. it comprises the fully continuum of education, skill formation processes and training activities."

One of the products of education is the ability to acquire skills more effectively. One way of integrating this complementarily education and subsequent training is to view them in the form of a pyramid. The base of the pyramid covers literacy and numeracy. These foundational skills are necessary to ensure that individuals are able to function productively as fully fledged citizens, with an understanding of both their social rights and claims and their social obligations and responsibilities. Learning "citizenship" and the culture of work are vital forms of socialization, which tend to be underemphasized in conventional education and training system. These are also increasingly important skills as workplace relies more heavily on teamwork. On this rests the layer of basic skills and capabilities. These include more analytical skills such as calculation and problem-solving. They may be developed directly or indirectly by general and academic education, and are fundamental to productivity in all forms and at all levels of employment. The third level in the training spectrum is formed by a combination of what is commonly referred to as general and specific skills. General skills include those capabilities that are transferable across employers within an occupation. The fourth, or apex, level of the pyramid is occupied by advanced technical or professional skills, which involves substantial investment of resources in learning. Each layer of the pyramid varies in terms of who is responsible for the provision of training as well as in terms of financing systems.
Foundational skills are targeted at achieving "universal primary education" or eradicating illiteracy of those who are no longer in the educational system. Basic education is the domain of the school, mainly the secondary vocational and technical schools, vocational training institutes, and apprenticeships encompassing both formal and informal on-the-job training. The objectives and content of the curricula in these programmes are derived from occupational standards, or more directly from analysis of the tasks that can be carried out on the job. At the post-secondary level, "technical education" or preparation of technicians occurs in institutions variously labeled as polytechnics, technical colleges or, in some cases, junior colleges. In both industrial and developing countries, firm-specific skills, i.e. skills specific to a particular enterprise or employer, are acquired through work experience and training during employment financed primarily by the enterprise.

4.10 Training Analysis

Talbot (1972) argued that for many years training has been seen as an extension of the education process within business, and that the learning process was seen as something which almost unavoidably took place outside the business.

The practical implications of the different sets of assumptions about the nature of training activity are most apparent in the way which training analysis is approached. Training analysis is defined as the process of diagnosis and analysis which enables realistic decision to be taken about the definition of training strategies, objectives, and methods to be employed, and forms a part of what is widely known as the Systematic Training (Fig. 14).
4.11 Training, Employee Development, and Knowledge Creation

Whereas in the past training may have been regarded by some organizations as a luxury, there is now a widespread acknowledgment by both academics and commercial organizations of its importance to the success of modern business. This recognition largely stems from globalization and the related intensification of overseas competition in recent years. It has not gone unnoticed that these countries whose economies have performed well in recent years, such as Germany and Japan, have emphasized the importance of training (Holden, 1997).
Training is the most effective way to maintain, update, and enhance the intellectual capital of the industry's workforce, and to ensure that its activities contribute positively to the well-being of society as a whole. However, investment in these areas remains at a relatively low level compared to other industries. In Singapore the skills level of the workforce is 23 %, in Western Australia and America it is 40 %, in Hong Kong it is 30 % and in Japan it is 60 % (Ministry for Manpower Singapore (MMS), 1999). This stems in part from the low-tech of the industry, which has always placed more value on brawn than brains. It also arises from the high degree of self-employment where so many companies highly geared to make expensive investments in training are separated from clients to benefit from any innovations, and have too short-term a perspective to make long-term investments in developing their employees. However, construction professionals are now more educated and sophisticated than any time in the past, and have higher expectations of their employers to provide for their personal career development (Drucker J. and White 1996a).

The object of training is to alter permanently the behaviour of employees in a way which will bring improvements in their achievement to reach the organizational goals. It should provide opportunities for an employee to learn job-related skills, attitudes and knowledge. Since training is a form of learning, to be successful it is essential that employees are motivated to learn, are able to learn, are able to transfer their learning to the job, and have their learnt behaviour encouraged and reinforced in the workplace.

Arguably the most important purpose of training in the modern dynamic environment is to bring about a learning culture. Keep and Rainbird (2000) suggest three different states of learning within an organization:

• individuals learning things;
• organizational learning, where the organization collectively develops ways in which it can learn collectively;
• the learning organization, where the central organizational goal is systematic learning.

Senge (1990: p. 3) defined the learning organization as one where 'people can continually expand their capacity to create the results they truly desire where new and expansive patterns of thinking are nurtured, and collective aspiration is set free and where people are continually learning how to learn together'. Thus, the concepts of the organization learning approach, effectively questions the individual learning and suggests a social and systemic learning dimension in determining how organization acquires, develops, and deploys their skills (Keep and Rainbird, 2000). A learning organization system is one that treats learning as a continuous process of improvement which is fundamental to business success (Armstrong, 1998).
Such organizations structure is more proficient at problem solving, developing new ideas, learning from their experiences and transferring new ideas into practice. Dufficy (2001) highlights the importance of employee training and development in enabling organizations to survive in the face of 'new industrial world' created by forces such as globalization, the increasing power of the customer, dramatic social and environmental changes, and the growth of e-business. Dufficy also argued that in the UK the automotive, electrical, and electronic industries are much more effective in dealing with these forces than is the construction industry.

Unfortunately, Drucker J. et al. (1996) found that most construction companies are far from being learning organizations, and there is no evidence to suggest that the same is not true for projects. The challenge of learning from project to project faces most construction firms, and one useful mechanism to capture and share experiences in projects is to conduct focus groups with participants as part of a post-project review (or post mortem). Also Kululanga et al. (1999) reported low usage, by construction companies, of tools widely recognized in the general business community to enable corporate learning. Ford et al. (2000) suggested that one possible reason for this is the predominant engineering culture which focuses on technology instead of people, and lacks an organizational development emphasis. Furthermore, the small subcontractors which employ the vast majority of the construction workforce confuse training responsibilities, and are so highly geared that long-term investments in training have been difficult. Drucker J. et al. (1996) also discovered that training within the construction industry was in decline, and found little evidence to old training initiatives being replaced with new ones. Indeed, many companies were closing down their management-development centers. They also argued that the severe skills shortages, which predictably emerge in every construction boom, were largely the result of a growing self-employment system. Nevertheless, training still is a fundamental requirement for improving organizational performance and filling skills gaps. Such information will be available from the job-analysis process, and these skills gaps will identify the needs and objectives of the programme in the short, medium and an important part of developing a training programme is the decision of whether to use on-the-job or off-the-job training. In terms of avoiding the potential problems of persuading project managers to release people from a project, on-the-job training offers a significant advantage over off-the-job training and is used for more than 60 % of training provision in the construction industry (Noe et al. 2000). Probably the biggest advantage is that people are still available to deal with problems occurring in the workplace. However, the close
proximity to work also has the potential to reduce training effectiveness significantly by distracting those who attend. Furthermore, remaining on site can make the training seem less attractive and not more than a day away from the project environment. However, one unobtrusive and stimulating method of on-the-job training is job rotations or transfers, which involve employees swapping jobs or sites for periods of time to give them a range of skills and experience. Job rotation is particularly useful in providing people with insights into interdependencies with working colleagues and for placing their own project in context. Another unobtrusive method is mentoring or coaching, where a supervisor is given formal responsibility to train an employee. If managed well, this is an effective means of learning, although it depends upon the quality of the mentors and their ability to impart knowledge and form personnel relationships with individual members of staff.

In an industry such as the construction there exist many barriers, both real and perceived, to even the most basic training and development activities. Loosemore et al. (2003) identifies these activities which include:

- Cost of training delivery: training activities are assumed to be expensive in terms of both cost and time.
- Clashes with production objectives: the notion that formal training activities require key-based staff to be removed temporarily from their operational responsibilities.
- Existing legislative training requirements: minimum training standards already exist that are protected by statutes in most countries.
- Staff turnover concerns: providing employees with training and development support makes them more attractive to other companies.
- A macro environment: the construction industry has a highly masculine culture, with a tradition of physical activities and an emphasis on production that cannot be learnt effectively in a classroom environment.
- A 'learn on the job' culture: the historical attitude towards developing a career in the industry has been to value experience as the primary learning mechanism rather than formal training or education.

Generalizing about the provision and effectiveness of skills training and development in construction is problematic for two reasons. First, different countries have different structures and training delivery mechanisms. Beardwell and Holden (1997) point that in many Asian countries, such as Singapore and China; HRD is often underpinned by strong government initiatives to improve knowledge and skills and to enhance the economic growth of the nation. Other countries adopt a much more laissez-faire attitude
towards HRD. The debate as to who should be responsible for training provision has been running for many years within the construction sectors, particularly with regard to the provision of craft and technical training. In the UK construction has retained a central organization which takes responsibility for overseeing training in the industry, known as the Construction Industry Training Board (CITB). The majority of the CITB's funding comes through a levy contribution from all construction firms with turnover above a certain level. This money is paid back to firms, which provide training deemed to be an appropriate standard, as well as being used to subsidize new-entrant training for those without employed status. The advantage of having this national training board is that training levels can be maintained even in times of economic recession, when construction companies are less likely to train (Drucker J. and White, 1996a). The equivalent body in Australia is Construction Training Australia (CTA). CTA is the National Industry Training Advisory Body (NITAB) and is charged with developing the industry's competence standards and working with industry to package the standards into relevant industry-endorsed qualifications.

It is important to note that, despite the historical division between craft and professional training within the U.K. industry, in recent years the establishment of the National Vocational Qualification (NVQ) structure has led to a uniform set of standards (Drucker J. and White, 1996a). These are competency-based standards, which come in levels from 1 to 5. Level 3 implies a level of competence compatible with that of a qualified trades-person, whereby the holder would be expected to work relatively autonomously. This is recently been taken a stage further through the initiation of the Construction Skills Certification Schemes (CSCS), where site-based workers of all types will be required to carry a card which indicates their level of training and competence as measured against the NVQ competence standards. This approach provides a uniform benchmark level of performance for both craft and professional roles and could lead to a convergence in the provision of training in the future.

4.12 Conclusion

As the study discussed in the introduction of this chapter, training should go hand-in-hand with wider Human Resource Management (HRM) practice, if it is to be effective in delivering better performance. As Brech (1971, p. 341, ed. Shaddad, 1983), a former chief executive of the CIBA, states:
"attaining, maintaining, and improving performance, productivity, profitability; that is what management is all about; that is what training is all about,"

It is important to note that training should be viewed as a means to an end and not an end in its own right. An organization that invests in HRD will derive organizational performance benefits only to the extent that it facilitates learning and the development of teamwork and knowledge (Holton, 1996).

Training and development are key aspects of the HRM practice, but are often overlooked as a mechanistic activity within many organizations. This is dangerous, since it grossly oversimplifies one of an organization's primary routes to competitive advantages. By defining the competency and development requirements of the individual employee in a team context and targeting the achievement of these competencies through training, construction organizations can ensure that their employees have the requisite skills to cope with a dynamic industrial environment as Dufficy, (2001) stated:

"the importance of employee training and development in enabling organizations to survive in the face of 'new industrial world' created by forces such as globalization, the increasing power of the customer, dramatic social and environmental changes, and the growth of e-business".

4.13 Main Variables of Organization of Training, Development, and Selection Subsystem as Conclusion

The study has been given an increasing interest in examining the links between Managerial Activities (variable 1.1) and Project Performance (variable 9.1), considering the link in a construction context and has argued that there is an absolute necessity to place HRM (Human Resource Management) issues at the center of decision-making. As Huczynski and Buchanan (2001:673) argued that: "A managerial perspective, with theoretical and perspective dimensions, which argues for the need to establish an integrated series of personnel policies consistent with organization strategy, thus ensuring quality of working life, high commitment and performance from employees, and organizational effectiveness and competitive advantage." Also, Marchington and Wilkinson (2000) argue that while human resource considerations should reflect business strategy, business strategy should also reflect human resource considerations. Competitive advantage is crucial to the growth and prosperity of any business, and involves the achievement of an advantageous market position to enable the consolidation and expansion of market share in relation to competitors. In order to sustain a competitive advantage any organization must commit itself to improvement, innovation and change (Porter, 1990). Each of these relies on the quality of an organization's human resources. At the business level, five independent variables are interconnected these are:
Competitive Labour Markets (variable 0.1), broader Social and Demographic Changes (variable 0.2) demand Improved Working Practices (variable 0.3) in order that Psychological Expectations (variable 0.4) can be met and so that staff are equipped for exploiting the Challenges of New Global Markets (variable 0.5). This coinciding with the ILO (1989, p. 21), argument that state: "...the overall goal of the global economy...four strategic objectives that are vital to social progress: employment creation, supported by increased and effective investment in human resources development, learning and training for employability, competitiveness, growth and social inclusion of all, promoting human rights at work, improving social protection; and promoting social dialogue."

The function of Human Resource Management (HRM) as secondary variable (variable 3.1) is considered a core managerial function (Managerial Activities) as a primary variable (variable 1.1) rather than a specialist support function, and is considered good practice for anyone with managerial responsibility to be involved with employee management issues (Cornelius, 2001)

As mentioned before that the purpose of Human Resource Planning (HRP) is the design of 'schemes for the acquisition, development, management, organization, and use of employees, so that, as with any other valued resource, they are deployed as effectively as possible to the achievement of organization goals' (Torrington et al. 1991). The Organization of Training and Selection Subsystem (variable 2.1) as primary variable will cause changes to the Human Resource Management (variable 3.1) as secondary variable. Human Resource Planning (variable 4.1) as intervening variable is the main function of the Human Resource Management (variable 3.1). Recruitment (variable 5.1), Selection (variable 5.2), Training and Development (variable 5.3) are the main basic functions and components of Human Resource Planning (variable 4.1).

The object of Training and Development (variable 5.3) is to alter the behaviour of employees in a way that will create improvements in the achievement of organizational goals. It provide opportunities for an employee to learn job-related Skills (variable 6.1), help people to acquire Knowledge (variable 6.2), changes in individual Ability (variable 6.3) and changes Attitudes (variable 6.4). Encouraging employees to work in a way which leads to better-quality products and therefore a more positive organizational images demands that they are trained and developed in a way which strives to achieve quality improvements. Also, ensuring loyalty, motivation (the next chapter will concern with motivation as a variable affecting Performance of the project) and commitment requires that people receive support and encouragement through training and development mechanisms. In accordance changes in these four variables, Skill (variable 6.1),
Knowledge (variable 6.2) individual Ability (variable 6.3) and Attitudes (variable 6.4), will cause changes in the following end result intervening variables:

a) **Highly motivated and satisfied worker**, variable 7.1, as Pigores and Mayers, 1969 (ed. Shaddad 1983) argued that: ‘‘..when employees are so well trained that they experience direct satisfactions associated with a sense of achievement and the knowledge that will develop their inherent capabilities at work’’

b) **Competence worker**, variable 7.2, as ILO's report (1998) stated that: ‘‘..retains a job, improves their productivity at work, and their income earning...’’

c) **Healthy and safety worker**, variable 7.3, as Levitt et al. 1976 (ed. Shaddad, 1983) argued that: ‘‘..reduces accidents, increase output,’’

d) **Low absenteeism and turnover**, variable 7.4, as Pigores et al. 1969, (ed. Shaddad, 1983) argued that: ‘‘..Dissatisfaction, complaints, absenteeism and turnover can be reduced...’’

e) **Continuity of production**, variable 7.5, as King et al. 1964, (ed. Shaddad, 1983) argued that: ‘‘..reduces learning (cycle) time; this is almost the traditional result of improved training methods, ‘’

f) **Cost control and project effectiveness**, variable 7.6, as Glueck 1974, (ed. Shaddad, 1983) “Training can reduce waste, and increases output...”

g) **High quality of production**, variable 7.7, as De Simon 1966, (ed. Shaddad, 1983) argued that: “Better quality is often quoted as a benefit of improved training method...” and

h) **Machine utilization**, variable 7.8 as Shaddad (1983) argued that: “improving the ability of an operator can affect machine utilization”

Consequently these changes will affect Efficiency (variable 8.1), Effectiveness (variable 8.2), and Competence (variable 8.3), and the end result variable which is System Performance (variable 9.1), as Martin et al., 2003 stated that: ‘‘, where those industries which invest in training tend to perform better and have a more positive public image than those which do not.” Also, Drucker et al. (1996) argued that:

“training is still a fundamental requirement for improving organizational performance and filling skills gap.”

The general and task Environmental Subsystem, variable 2.3, will influence every variable in the system.
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CHAPTER 5

MOTIVATIONAL SUBSYSTEM AND ITS AFFECT ON HUMAN RESOURCE MANAGEMENT

5.1 Introduction

The term motivation derives from the Latin word *movere*, meaning “to move”. In the present context motivation represent “those psychological process that cause the arousal, direction, and persistence of voluntary actions that are goal directed.”, (Mitchell 1982).

Harris (1994) identifies two categories of forces affecting employee behaviour: 1) those within the employee, including motivation, attitudes, and KSAs (knowledge, skills, and abilities); and (2) those found in the environment, including the supervisor, the organization, co-workers, and the outcomes of performance (such as praise). In this chapter the study reviews the motivation forces which affect the human behaviour as a variable, and the other variables inherited by the behaviour as attitudes and KSAs. Also, it will review the external environment as a major managerial variable in the next chapter.

5.2 The Organization of Motivational Subsystem, Rewards, and Performance Appraisal

5.2.1 Definition of Motivation

Psychologists during the last hundred years have used the term 'motivation' in many different ways. The definition of motivation at one level means: "one inner desire to make an effort" (Dowling and Sayles, 1978 p.16). Other definitions emerged as follows:

a) Buchman and Huczynski (1991) define motives as ‘learned influences on human behaviour that lead us to pursue particular goals because they are socially valued. Motivation on the other hand is a decision-making process through which the individual chooses desired outcomes and sets in motion the behaviors appropriate to acquiring them’.

b) Kast and Rosenzweig (1981) defines motives as ‘what prompts a person to act in a certain way or at least develop a propensity for specific behaviour. This urge to action can be touched off by an external stimulus, or it can be generated in individual physiological and thought processes’.

c) Ballachey *et al.* (1962) defines motivation as ‘the direction and persistence of action. It is concerned with why people choose a particular course of action in preference to others, and why they continue with a chosen action, often over a long period, and in the face of difficulties and problems’.

d) Kempner (1987) defines motivation as ‘the process of initiating and directing behaviour. Individuals produce and sustain behaviour when they find it rewarding to do so; that is, when the behaviour accomplishes an objective that satisfies a need’.

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Mitchell (1982) identified the following four characteristics which underlie the definition of motivation:

- Motivation is typified as an individual phenomenon.
- Motivation is described, usually, as international.
- Motivation is multi-faceted.

Whilst there is no one definition, there now appears to be a general agreement that 'motivation' is primarily concerned with:

(a) The forces which stimulate human behaviour,
(b) The forces which direct or channel such behaviour,
(c) The means by which this behaviour is maintained or sustained (Birchall, 1977/78 pp. 1-8).

Two different views of the nature of humans have dominated research in the field of motivation. One school of psychologists, influenced by Freud, assumes that inherited, conflicting, unconscious drivers, which lead him to behave instinctively, drive man. The second school, influenced by Tolman and Lewin, believe man to be a rational being, aware of goals and acting in ways which lead to goal achievement. The two groups of psychologists have approached the study of motivation from different starting points. The former attempts to understand unconscious motives, and concentrate upon the analysis of fantasies, though. The latter attempts to understand how people's goals develop, and how people learn to formulate goals. It is assumed that motivated behaviour, therefore, is purposeful and goal-directed and in consequence under central or voluntary control. It is further assumed that the individual receives feedback from the environment, which either reinforces the initial drive and direction or dissuades the person from that particular drive and direction of effort. A definition of 'motivation' as presented by Jones (1955 pp 1-8) will be adopted;

"... How behaviour gets started, is energized, is sustained, is directed, is stopped, and what kind of subjective reaction is present in the organism while all this is going on..."

Contemporary psychologies have proposed and researched various different theories of motivation to review and contrast the five different theories of human motivation in a work setting. The first three, the need hierarchy, motivation-hygiene and achievement motivation theories are all referred to as content theories because they focused upon identifying those specific factors in the individual or his environment, which determine behaviour. The other two, equity and expectation/valence theories, are termed process theories because they concentrate upon an understanding of the processes by which
behaviour is energized and sustained. The latter also concentrate upon the individual's perception of the situation rather than reality.

The following conclusions derived by Birchall (1977/78) about motivation at work:

(a) Man is both complex and variable. Whilst at any given time he will have a hierarchy of personal needs including those relating to both pain avoidance and psychological growth, this will vary with time and situation in complex patterns.

(b) Self-esteem and self-actualization needs increase in intensity as a result of activation due to partial satisfaction.

(c) High achievement motivation and a suitable work situation are likely to lead to good job performance.

(d) Individuals who perceive inequity in the level of reward for the effort expended are likely to take steps to reduce this perceived inequity.

(e) Experiences lead to the development of new patterns of motivation; hence the individual's pattern of motivation and his relationship with the organization result from complex interaction between initial needs and organizational experience.

(f) Personality traits, skill level, job knowledge, interactions with co-workers and managers, the nature of the tasks and organizational setting are some of the factors which interact in a complex fashion to determine the individual's level of motivation.

(g) Man's motivation patterns are variable; he may find satisfaction from some aspects of the job whilst being dissatisfied with others.

5.3 **Factors Influencing Employees' Motivation within an Organization**

Naoum (2001) summarized the factors that influence employee motivation which are under four broad headings:

a) employee characteristics

   (i) needs and expectations: briefly individuals differ in their needs for the followings:

   - material or intrinsic needs such as: money or other materials benefits e.g. car or company pension,
   - organizational or extrinsic related needs such as: power, responsibility and achievement and a challenging job, etc.
   - Task-related needs such as: good equipment, good working relationship, and good supervision.

   (ii) age and maturity: naturally, the above needs and expectations fluctuate with maturity and age of person.
b) Management factors:
   (i) management/leadership style: are clearly identified in chapter 6,
   (ii) human resource management: are clearly identified in chapter 4,

c) Organizational characteristics:
   (i) job characteristics: are identified below in the section of job design.
   (ii) structure and job design,
   (iii) quality of work environment,
   (iv) communication (group cohesiveness).

d) outcome:
   (i) task performance/goal achievement,
   (ii) employee job satisfaction.

5.4 Job Design as a Motivator

5.4.1 Introduction

Structuring and/or restructuring the organization can have a significant impact on work groups and job design or redesign. This in turn will influence employee motivation and job satisfaction. Adam Smith (1977) believed that specialization would not only increase skill and dexterity, but also reduce the time spent changing operations, and accelerate the development of improved methods.

Task specialization, standardization, and work simplification are three of the key implementing concepts of what is now called the classical approach to job design. Not only have these principles demonstrably contributed to greater efficiency and uniformity of output, they have also been cost-effective. The process of defining work roles and relationships can be summarized under the concept of job design, which seeks to specify the contents, methods, and relationships of particular roles in order to satisfy both organizational requirements and the needs of the individual job-holder. This means that the function of designing and specifying job roles must ensure that fulfilling and motivating positions are developed which accord with the strategic objectives of the organization.

Job design, however, is particularly concerned with the relationship between individuals and the nature and content of jobs and their task functions. It attempts to meet people's personal and social needs at work through reorganization or restructuring of work. Mullins (1999) identified two major reasons for attention to job design:

- to enhance the personal satisfaction that people derive from their work
to make the best use of people as a valuable resource of the organization, and to help overcome obstacles to their effective performance.

There are three fundamental mechanisms associated with re-design or restructuring a job (Fig. 15): (1) job rotation; (2) job enlargement; (3) job enrichment.

Armstrong (1991) identified four factors which are important to effective job design: the process of intrinsic motivation; the characteristics of task structure; motivating characteristics of jobs; and the implications of group activities. In order to reconcile organizational and individual needs in relation to these factors, techniques such as job rotation, job enlargement, enrichment and empowerment can be used. Job design can also be used as an important tool in engendering organizational change (Torrington and Hall, 1995). Two of the earliest concepts associated with the behavioral approach to job
design were job enlargement and job enrichment. Job enlargement refers to adding tasks to a job so that a variety of activities is increased. In job enlargement, the new tasks are on a par with the original ones in regard to difficult and responsibility.

Job design is defined as a means of enriching the work experience for employees and increasing the quality and/or quantity of work output. Reif (1973) defines the term as follows: “Job enrichment is concerned with designing jobs that include a greater variety of work content, require a higher level of knowledge and skills, give the worker more autonomy and responsibility for planning, directing, and controlling his job, and provide the opportunities for personal growth and meaningful work experience.”

Hackman and Oldham (1973) have identified five major characteristic of an enriched job. The five factors are skill variety, task identity, task significant autonomy, and feedback (Fig. 16).
Mills (1975) suggested five possible causes for the interest in job enrichment:

1. Many attempts to enrich the job are intended to alleviate the problem of alienation/boredom and job dissatisfaction among workforce.

2. Decreasing motivation and increasing counter-productive behaviour have led many managers to look at job enrichment as antidotes.

3. Job redesign is seen as a way of responding to the rising expectations of the workforce and the inability of many institutions to meet these demands effectively.

4. The age of industrialism is dying in advanced societies and job enrichment represents a turning away from the narrow pursuit of materials goals.

5. Effective design and redesign of existing job represents sound management since it means more effective utilization of human resources in meeting organization and personal goal.
5.5 Job Satisfaction as a Motivator

5.5.1 Introduction

Work satisfaction has been a topic of great interest for researchers and practitioners in a wide range of fields including industrial psychologies, public administration business, and higher education. In the U.S. (Porter and Steers 1973; Lock, 1976; Mitchell and Larson, 1987; Rice et al. 1980) the study of job attitudes or how people feel about their work has become a prominent area of study within the field of organizational behaviour. Industrial and organizational psychologists have published many research reports and articles on motivation and work behaviour. Since the 1940s, the subject of job satisfaction has been one of the most widely studied topics in the management field. Mitchell and Larson (1987) and Rice et al. (1991) have indicated that over 3,000 studies have been carried out on job satisfaction over the last sixty years. This interest has developed as the U.S. has learned more about worker development and has become more interested in small health, employee training and development, and supervisor-subordinate relationships (Porter and Steers, 1973; Lock, 1976; Khalegce and Rahman, 1987; Khalegce and Rahman, 1987). The reason for this interest lay in the assumption that there was a relationship between the satisfaction of workers and their productivity, attendance and desire to remain in the organization. During the last thirty years a great deal has been written about the concern the relation of motivational process to other important organizational factors (such as job design, reward systems, group dynamics, etc.).

Various definitions of job satisfaction have been advanced. The most comprehensive definition of job satisfaction was given by Locke (1983), following his thorough review and investigation of theories and definitions of job satisfaction. He states that 'job satisfaction results from the appraisal of one's job as attaining or allowing the attainment of one's important job values. Producing these values is congruent with, or helps to fulfill, one's basic needs'.

5.6 Theoretical Framework of Job Satisfaction

It was Napoleon who remarked that, "An army's effectiveness depends on its size, training, experience, and morale, and morale is worth more than all the other factors combined." Locke (1976) defined job satisfaction as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experience". Implicit in Locke's definition is the importance of effect and cognition. Hulin (1991) appears to agree with Locke. While Hulin's review places
considerable emphasis on cognitive processes that determine job satisfaction, he refers to the outcome of these processes as work role effect, implicitly recognizing the interplay between perception, evaluation, and effect in judgments of job satisfaction. Some researchers have argued that job satisfaction reflects more cognitive than effective components (Organ and Near, 1985).

Frederick Herzberg's two-factor theory (Herzberg, 1967) argued that the factors that lead to satisfaction are often different from those that lead to dissatisfaction. Herzberg based this conclusion on a series of interviews of workers. When asked to consider factors connected to a time when they felt satisfied with their jobs, individuals generally talked about intrinsic factors, such as the work itself, responsibilities, and achievement (Herzberg termed these motivators). Conversely when workers asked to consider factors that lead to dissatisfaction, most individuals discussed extrinsic factors such as company policies, To cause individuals to be satisfied with their jobs, then, the organization must focus on motivators’ factors such as making the work more interesting, challenging and personally rewarding. Hulin et al. (1985) and Hulin (1991) provide a model of job satisfaction (Fig. 17) that attempts to integrate previous theories of attitude formation. The model proposed that job satisfaction is a function of balance between role inputs-what the individual puts into the work role (such as training, experience, time, and effort)-compared to role outcomes-what is received (pay, status, working conditions, and intrinsic factors). The more outcomes received relative to inputs invested, the higher work role satisfaction will be, all else being equal.
The job characteristics model (JCM) argues that job enrichment is the core-underlying factor in making employees satisfied with their jobs. The model, introduced by Hackman and Oldham (1976), focuses on five core job characteristics to make one's work challenging and fulfilling: (1) task identity, or the degree to which one can do one's work from beginning to end, (2) task significance, or the degree to which one's work is seen important and significant, (3) skill variety, or the extent to which the jobs allow employees to do different tasks, (4) feedback, or the degree to which the work itself provides feedback for how the employees is performing the job. According to the theory, jobs that are enriched to provide these core characteristics are likely to be more satisfying than jobs that do not provide these characteristics.
The relationship between job satisfaction and performance has an interesting history. The Hawthorne studies are credited with making researchers aware of the effect of attitudes on performance. Shortly, often the Hawthorne studies, researcher began taking a critical look at the hypothesis that a happy worker is a productive one. Identifying related underlying and motivational theories could approach job satisfaction. These theories can be grouped into two categories: content theories and process theories (Chung 1977; Carlisle, 1982; Dyer et al. 1990). Content theories provide an account of the factors influencing job-satisfaction. Included in the content category are: need fulfillment theory and Herzberg two-factor theory. Content theory attempts to specify the particular needs or values which must be satisfied, or attained (respectively) for an employee to be satisfied with a given job. In the second category are: equity theory and valence theory. The process theory provides an account of variables such as employee's needs and expectations interact with job environmental characteristics to produce worker satisfaction (Hopkins, 1983; Bennett, 1994).

Process theories attempt to specify the types or classes of variables (needs, values, expectations, and perceptions) considered casually relevant to satisfaction (Locke, 1976). All variables are considered because of the significant relationship they have with each other (Bennett, 1994).

Job satisfaction is an individual's feeling of pleasure derived from a job. It can be brought by different factors in the workplace, like nature of work, salary level and relationship among employees (Muckinsky, 1989). But a job is not a single entity; it consists of various aspects, like tasks, roles, responsibilities, and interactions. And these various aspects may also give different levels of satisfaction to the same individuals.

Several theories are presented to explain the concept behind job satisfaction. The first theory is the Interpersonal Comparison Theory (Muckinsky, 1989). This theory states that the degree of satisfaction of an individual depends on two factors: the individual's own standards and the person's perception of how his standards are met by the job. If the difference between the two is negligible then the person is greatly satisfied while a large discrepancy between them means that the person is not satisfied. Another theory about job satisfaction is the Interpersonal Comparison Theory (Muckinsky, 1989). In this theory, the person derives satisfaction by comparing his feelings with others that are doing the same job. If many people seem to be satisfied with work like his, then he too will be satisfied with his own job. The main similarity between the Interpersonal theory and this theory is that satisfaction is derived from work comparatively.
5.7 Employee Motivation in the Construction Industry

The construction industry offers jobs and careers which appeal to many because of their interesting, challenging, and rewarding nature. However, these attributes result from factors which to many workers are unacceptable, e.g. outdoors work, high labour mobility and job insecurity, and constant changes in technology and methods. Employment in manufacturing industries is unpopular to a large sector of the population and construction is generally considered an even less desirable option. Consequently, the industry experiences difficulties and retains employees with high ability and potential.

Employees are being required more and more to adapt and learn new skills. Rationalization of component design and manufacture as well as mechanization and rationalization of construction processes have contributed to changes in the skills demanded by jobs. Traditional skills are now employed infrequently, being replaced by work, which may be classified as semi-skilled. Further changes, both technical and human, will be necessary in order to achieve higher levels of productivity. These changes have an impact upon the motivation of those currently employed as well as potential recruits.

In many construction projects the emphasis is almost entirely upon monetary rewards, but it is debatable whether this strategy achieves the aim of motivating people and organizations to perform to their highest level. Human relations theorists recognized that all kinds of cognitive processes affect the relationship between pay and motivation. In particular Maslow (1984) argued that all human behaviour stems from needs and drives which are innately biological in origin. He proposed a hierarchy of needs which in descending order were self-actualization, ego-esteem, social, safety, and physiological need. Only lower level needs (physiological and safety) motivate people to earn money to buy shelter etc., which means that the motivational impact of money is limited and soon lost. Herzberg's (1959) hygiene theory identified two sets of factors involved in motivation: hygiene factors and motivators such achievement, recognition, responsibility, and working itself which act directly upon motivation levels. Herzberg argued that good pay would not motivate but merely reduces dissatisfaction. More recent social comparison (equity) theorists have argued that motivation is affected by perceptions of fairness and equity in terms of comparing pay levels to others. Furthermore, there is an expectancy force at pay, which ensures that motivation from pay will also depend upon how closely it approximates people's expectations of what is reasonable for their effort. Thus, the link between pay and motivation is far from clear, and so it is important that manager has reward systems which
have monetary and no monetary elements attached to it. Before we continue discussing the rewards we have to park a while for performance appraisal system.

5.8 Performance Appraisal System

5.8.1 Introduction

Performance appraisal is a sensitive process which involves measuring the contribution of every employee towards the accomplishment of an organization’s objectives, now and in the future, for the purpose of identifying rewards and penalties. The underlying objective of performance appraisal, as with so many of the SHRM functions, is to improve the performance of individuals in such a way as to contribute to the performance of the organization as a whole (Mullins, 1999). However, performance appraisal is not a one-way process, and it should also serve as an important input of information to human resource planning and development. It should help to identify skills gaps and whether employees need training, and it encourages supervisors to monitor their workforce in a systematic way. The contemporary focus on integrating SHRM with business strategies has led to most organizations seeing performance appraisal as just one part of a more systematic approach towards performance management (Bach, 2000). Thus there has been a shift away from performance appraisal towards performance management. However, performance appraisal still remains an integral aspect of performance management and an important tool for managing rewards within the many construction organizations (Martin et al. 2003).

The importance of performance appraisals to the lives of individuals and the prosperity of organizations that are assessed has ensured that the process has been surrounded by controversy. The quality expert Deming (1994) believed that performance appraisals were subjective, open to bias, unreliable, unmeaning, short term in focus, divisive, destructive, and that they introduced fear and politics into the workforce. Indeed, in a survey of a range of industries Vinson (1996) found that only 10% of employees are happy with their appraisal system and that, ironically, more often than these systems are counterproductive to performance.

Bernardin and Casico (1987) suggested that an appraisal system should adhere to the following rules:
1. Procedures for personnel decisions must not differ as a function of the race, sex, national origin, religion, or age of those affected by such decisions.
2. Objective, non-rated and uncontaminated data should be used when-ever it is available.
3. A formal system of review or appeal should be available for disagreements over appraisals.
4. More than one independent evaluator of performance should be used.
5. A formal, standardized system for the personnel decision should be used.
6. Evaluators should have ample opportunity to observe rates' performance (if ratings must be made).
7. Ratings on traits such as dependability, drive, aptitude and attitude should be avoided.
8. Performance appraisal data should be empirically validated.
9. Specific performance standards should be communicated to employees.
10. Raters should be provided with written instructions on how to complete the performance evaluations.
11. Employees should be evaluated on specific work dimensions rather than a single overall or global measure.
12. Behavioral documentation should be required for extreme rating (e.g. critical incidents).
13. The content of the appraisal form should be based on a job analysis.
14. Employees should be provided with an opportunity to review their appraisal.
15. Personnel decision-makers should be trained on laws regarding discrimination.

5.9 Performance Appraisal in the Construction Industry

There are two broad types of techniques used to conduct assessments, namely those based on direct comparisons with other employees (multi person/company evaluations) and those conducted in isolation (single person/company evaluations). In construction projects and at the organizational level, appraisals are normally undertaken in isolation, and by measuring progress against objectives. Management by Objectives (MBO) is by far the most common method of evaluation found in traditional job-oriented organizations, and is based wholly upon output and process criteria. Other technique for traits criteria is the graphic rating scale, the forced rating scale, the essay technique and the critical-incident technique. The graphic rating scale technique is essentially based on a checklist with criteria which can be graded on a scale of 1 to 5. The tendency of people to tick 3 and provide an indifferent evaluation has led to the forced rating scale technique which simply requires assessors to rate a person's relative performance across a range of
criteria. The easy technique requires the assessor to write a verbal exposition on an individual's performance, and the critical-incident technique requires assessors to maintain a log of behavioral incidents, which give some insight into a person's performance at work.

The problem facing construction personnel managers concerns their capacity to deliver performance-related pay systems which link organizational and managerial rewards to broader SHRM objectives (Druker and White, 1996a). Competence-base or skill-based systems are one way of achieving this goal, as incentive schemes rewarding collective working and project-team cohesion for improved project performance. A distinction between the various methods of appraisal available concerns the nature of the measures that are used. Measurement can be made in either a quantitative (e.g. using rating scales of 1 to 5 which relate to various aspects of performance) way or qualitatively (e.g. using descriptive reports of employees' performance). One approach, known as behaviorally anchored rating scales (BARS), is designed to allow a measurement to be made of performance in the actual job being appraised. Essentially, the process involves defining a benchmark of appropriate practice based on the collective perceptions of managers who are asked to decide what the key behavioral requirements for performance are, and to attach a scale for poor, average, and high levels of performance. Although costly to construct, BARS do offer the advantage that the performance measures are based on a consensus of managers’ opinions of what is required for a particular function. BARS can also include more general performance metrics such as teamwork.

5.10 Goal Setting and MBO as a Performance Appraisal

It is important to see organizational goal setting in relation to behaviour, to motivation, and to other theories and ideas involving goals. People are complete processors of information both cognitive and emotional. Goals are internal psychological representations of desired states which can be defined as outcomes, events, or processes. They encompass terms like intentions, aims, purposes, and objectives. It is part of the human conditions that almost all voluntary human activity is at least partially caused by goals. Abilities, needs, values, desires, and goals all contribute to action, and the composite of causes varies across behaviour.

Other theories of motivation address how needs, value, personality, rewards, and the work itself might influence goal selection or influence behaviour directly, independent of goals. Mitchell (1977) concludes that: "Goal setting is clearly the star performer. It is the single most
researched topic in the field of motivation.” The importance of goals with respect to work behaviour resides in:

1. Increase in the difficulty of assigned goals leads to increases in performance.
2. Specific, difficult assigned goals result in higher performance than do best or no assigned goals.

The first proposition predicts a linear relationship between goal difficulty level and job performance, given that the individual accepts the goals. Over 90% of the studies support this proposition with the effect size on performance being about 10-15% increase as a result of goal level (Cooper et al. 2000). The second proposition is that goal specificity is important: Hunter and Schmidt (1987) Locke and Latham (1990) reported that about 90% of 200 studies show support for this proposition. Rodgers and Hunter (1991, 1994) on MBO and the work by Pritchard (1995) with his PROMES system (that includes specific goals) show that introducing specific goals definitely has a positive impact on performance.

A key plan of many pay plans is the setting of performance goals. Goal-setting theory (Locke and Latham 1990) suggested that specific, difficult goals, accompanied by feedback on performance, lead to higher performance by focusing individuals’ attention, increasing effort, and strengthening persistence toward task accomplishment. For more complex tasks, goals lead individuals to engage in more planning and enhance strategy development. Critical factors in the success of goal setting are individual’s commitment to the goal and their self-efficacy (that is, task-specific, self confidence).

Research has shown that goal setting and incentive are related, in that making pay contingent on goal attainment increases commitment to goals (Locke and Latham, 1990; Reed et al., 1988; Wright, 1992). However, there are complex interactions between goal difficulty and the type of incentive as they combine to influence performance, so that the expected positive effect of hard goals on performance occurs under peace-rate and hourly pay systems, but no under all-or-nothing bonus pay system. When a bonus is at stake, a hand goal (as compared to a goal of moderate difficulty) can lead to poor performance, presumably because individuals may doubt their capabilities to attain the goal and this earns the bonus (Lee et al. 1997; Mower et al. 1981).

5.11 Rewards Management

5.11.1 Introduction

Pay is a central feature of the relationship between employer and employee. Reward management is a relatively new term for what used to be called pays and benefits.
administration (or remuneration planning or compensation and benefits management). Rewards system are one of the four human resources management policy areas incorporated into Beer et al. (1984) and Fomburn et al. (1984) theoretical model Fig. 18.

In most theoretical models of HRM, pay is central to the regulations of the employment relationship. Beer et al. (1984) affirms that "the design and management of rewards systems constitutes one of the most difficult HRM task for the general manager" (Bratton et al. 1999). Economic and social factors present further challenges with managing reward system. Global forces at work today compel managers to improve labor productivity and the quality of their organization's product and services, while controlling wage costs. Social factors impinge on reward management, such as employee expectations and notions of fairness regarding their pay. Given these pressures, human resources manager seek to design reward systems that facilitate achieving the organization's strategies goals and meets goals of individual employees. Rewards are defined in the following terms 'reward refers to all forms of financial returns and tangible services, and the benefits employees receive as part of an employment relationship' (Bratton et al., 1999).
All managers have to decide upon rates of pay. Pay structure and performance will be rewarded. Reward management is about the design, implementation and maintenance of these systems, which support the improvement of organizational performance (Armstrong, 1998). Reward is the reason why the majority of individuals seek employment, and those who perform well expect to be rewarded in some way, particularly in the case of the highly commercialized construction industry. The objective of reward-management strategies should be to create a system of rewards that motivates people to work towards an organization's goal. In essence, a manager can either provide monetary rewards. Monetary rewards include, pay, bonus, stock options, profit shares, etc. and no monetary rewards can include prizes, awards, and promotions to jobs with greater status, responsibility, and authority. We can classify these inducements under two headings:

- **Extrinsic rewards**: tangible rewards such as salary, bonus, commissions payments, working conditions, company cars and pension. These rewards are effectively the "hygiene" factors identified by Herzberg.
- **Intrinsic rewards**: the opportunity to satisfy other goals such as life style, comfort, a sense of achievement strategy, acclaim challenge etc. These are the factors to satisfaction and motivation.

**5.12 Developing Effective Rewards System in the Construction Industry**

The norm for manual workers was a system of industry wage rates topped up at local level by additional amounts of money, much of it the product of incentive payment by
results (PBR) schemes and various premium payments for overtime, shift work. In short, manual workers' pay was primarily aimed at rewarding productivity. In contrast, non-manual pay systems were largely aimed at rewarding loyalty and service. Pay progression, apart from periodic cost-of-living increase, was largely based on seniority and promotion.

Human resource management literature emanating from the U.S. suggested that pay could be a major lever in achieving organizational changes and establishing a sophisticated method of management control (Lawler 1990). It is expectancy theory which has relevance to reward management. Porter and Lawler (1968) adopted Vroom's original concepts to provide a model (Fig. 19) of how employers can influence employee motivation. In contrast to human relation school approach, which tends to assume that job satisfaction leads to improved performance, Porter and Lawler suggested that satisfaction lead to improved performance. They also suggested that satisfaction is an effect rather than a cause of performance. It is performance that leads to job satisfaction, rather than vice versa.

Expectancy theory can be a vital tool in designing a reward system. Because it embraces a number of dimensions of motivation, it can be applied to virtually any level of employee within a construction firm.

![Fig. 19 Vroom's Model of Expectancy Theory](image)

The managerial criteria for pay are (Child, 1984) as follows:
- To attract and retain staff
- To encourage dependable behaviour
- To secure high commitment and effort
- To foster flexibility
- To foster innovation.

For employees, in contrast, the criteria are:
- Intrinsic reward
- Extrinsic reward
- Fairness (internal equity)
- External comparability.

The starting-point in the design of reward system is the establishment of some form of grading system which denotes the value each job has within the organization. This is normally done by comparing the content of jobs within the organization so that a hierarchy of grades is created. Given that construction is an industry of many small firms it is perhaps not surprising that formal grading system and the use of job evaluation are rare. Evidence suggests that pay systems in the major contractors tend to be relatively in formalized. In 1966 Greenwich Surveys, only 12 companies out of 41 had a formal grading system for manual workers, and only 15 for non-manuals. More importantly, only two companies out of 41 used job evaluation for manual workers, and only 8 for non-manuals. Three companies used the same grading system for manual and non-manual workers, but the great majority had separate arrangements for two groups. This absence of formal grading system reflects the general picture of construction as an industry relatively lacking in human resources management systems.

Job evaluation is the process of assessing the relative 'size' of jobs within the organization (Armstrong and Murlis, 1994). Its primary purpose is to provide a national basis for determining and managing internal relationship between jobs and for the design of pay structure. The information collected for a job evaluation exercise can be used for a variety of other purposes as well as pay-organization design, human resource planning, training, and continuous development. It is important to understand five facts about job evaluation:
- Comparative
- Judgmental
- Analytical
- Structural
- Job-centered
Once a grading system has been established, a pay structure can be erected. Pay structures vary greatly between industries and companies, and largely reflect the norms of behaviour in each sector within the construction industry. Smaller organizations have relatively informal systems but the larger companies, especially where staff may move between divisions, tend to have more formal pay structures.

In general, there is still a strong division between the payment systems for manual workers and those for non-manual workers, and nowhere is this truer than in construction. For directly employed manual workers, pay structures tend to be very simple: there are few grades, and hourly and weekly wage rates are set at industry level. These rates of pay may be embraced through various allowances (such as abnormal conditions, tool allowance, etc.) and through overtime or shift premiums. Financial incentives schemes were introduced into the construction industry after World War II as a mechanism to increase output, and were common up to the 1970s. The frameworks for this payment by result (PBR) incentive schemes are covered by the industry-level national agreements, but there is some evidence of a decline in this area, mainly because of the growth of self-employed labor. Incentive pay appears to be more significant pay component in construction than elsewhere. According to the government's annual New Earnings Survey for 1995, PBR makes up around 8% of total earning in the construction industry. The Greenwich Survey found that few construction firms link the pay of their manual workers to individual performance measurement (only 13 companies) only 11 used group-on team-based incentive. 12 companies provided site productivity and completion bonus. Three companies include their manual workers in company-wide bonus schemes, and two have bonus for achieving quality standards targets (Druker and White, 1996).

Most construction PBR schemes are work-measured (i.e. the tasks are timed and operatives' work is measured on completion against standards). Schemes can be either individual-based or group-based. Another common feature of the industry in the past was the 'end-of-product' or completion bonus which rewarded employees for completing the contract ahead of schedule or, where work was slipping behind, completion to the deadline. For non-manual workers, payment systems are generally composed of annual salaries with an annual cost-of-living increase and/or performance-related bonus. Grades tend to be broad-banded [wide gaps between minimum and maximum salaries for each grade] and sometimes grouped into job families. The Greenwich Survey found not a single company, which used age-related or service-based incremental progression, and 19 used individual managers 'discretion'. Four used ‘all-merit’ appraisal-based spot salaries, and
three used competency-based systems, although 10 companies said that individual salaries were linked to formal performance appraisal-related performance pay. This suggests that many construction firms have fairly informal salary progression systems; increase being decided largely at management's discretion.

Patton (1977) argued that to be effective, compensation system must be:

- Adequate: provide basic security for employee/organization;
- Equitable: provide rewards which are in line with efforts and contributions;
- Balanced: between monetary and non-monetary balance;
- Cost-effective: affordable to the employee; Incentive providing: employee should see the benefits of diligence and of seeking opportunities to improve performance;
- Acceptable: the employee should be happy with them.

There is a wealth of literature going back many years which points to the inequities contained within construction contracts, particularly towards subcontractors. More recently, with the abolition of fees scales, professionals are also complaining of inequities in the construction markets. This incentive is of particular concern because it has been linked with poor performance. Loosemore (1999a) found that it is a significant source of conflict between subcontractors in the construction industry, and recent studies of civil engineering in Australia (Lingard, in press) found that it is the engineers who compared this input-output ratio as unfavorable with ratios enjoyed by other professions. This has led to cynicism and dissatisfaction with their profession. According to equity theory, an individual perceives a situation as far within organization is important, as failure to do so is likely to increase employees' turnover rate.

In construction, reward structures are particularly problematical for outsourced work and subcontracted labour, where, although systems are considerably affordable to contractors, there is a considerable evidence to suggest that organizations do not perceive the system to be equitable, adequate, acceptable or to provide incentives. Certainly the emphasis is very much on penalties rather than rewards, and those rewards that are provided are almost exclusive in nature.
5.13 Skills, Knowledge, and Abilities in Construction Industry

5.13.1 Introduction

Attitudes and knowledge, skills and abilities (KSAs), like motivation, are also internal factors that influence employee behaviour. Fishbein et al. (1975, p.216) define an attitude as follows: "it represents a person's general feeling of favorable or unfavorableness toward some stimulus object." Attitude also tends to be stable over time and is difficult to change (Staw et al. 1985).

Despite the ubiquitous nature of KSAs in HRD, these factors can be difficult to define with precision. Definitions differ according to the person defining them. Edwin (1972) defines abilities as “general capacities related to the performance of a set of tasks." Abilities develop over time through the interaction of heredity and experience, and are long-lasting.

Skills are similar to abilities, but differ in that they combine abilities that are developed as a result of training and experience (Dunnette, 1976b). Skills are often categorized as ‘psychomotor activities’ (while abilities tend to be more cognitive) and are typically measured in terms of the ease and precision evident in the performance of some task (Goldstein, 1991).

The term "skill" refers to an acquired and practiced ability, or to a qualification needed to perform a job or certain task competently. It is a multidimensional concept as most jobs require a combination of skills for adequate performance, ranging from physical abilities like eye-hand co-ordination (analytical and synthetic reasoning, numerical and verbal abilities) and interpersonal (supervisory, leadership, social, communicative) skills.

Finally, knowledge is defined as the understanding of factors or principles related to a particular subject.

Focus on the improvement of the knowledge, skills and abilities (KSAs) of individuals. Harris (1996, p.10) argued that:

"Training involves a process of providing KSAs specific to particular task or job. Development activities, in contrast, have a long- term focus on preparing for future responsibilities while increasing the capacities of employees to perform their current job. Skill and technical training programs then narrow in scope to teach the new employee a particular skill or area of knowledge."

Harris (1994, p.18) also identifies a number of challenges facing HRD practitioners. These challenges include (i) changing work force demography, (ii) competing in global economy, (iii) eliminating the skills gap, (iv) the need for lifelong learning. For companies to compete successfully in a global economy, they must hire educated workers. Even

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though the U.S has one of the highest standards of living in the world, a large number of American workers -between 20 and 30% according to the Office of Technology Assessment- lack basic writing, reading and computational skills (Stone 1991).

Organization has become increasingly dependent on skilled technical and professional employee. Of the jobs created between 1983 and 1990, 40% were skilled and technical jobs, 40% were classified as management and professional, and only 20% were lower level unskilled position (Carnevale et al., 1989a). The need for skilled and technical training is generally a function of change in job requirements resulting from such things as introduction of new technology, new organizational goals and structural changes (Fossum & Arvery 1990). New technology, whether it is a result of plant modernization, computerization, or other innovations, has helped to create a shift away from jobs demanding higher skill levels.

Training technique may be performed on or off the job. On-the-job training is job instruction normally given by an employee's supervisor or an experienced employee. Some common on-the-job training technique includes job rotation, enlarged job responsibilities, job instruction training, learned, controlled instruction, and apprentice training. Apprentice training, a combination of on-and off-the-job training, is widely used in skilled trades such as carpentry, welding, printing, etc. Apprentice training involves co-operation among employees, the government, educational institutions (usually vocational or technical schools), and labor union.

5.14 The Historical Development of Skills Training

The range of trades in the construction industry is diverse and is becoming increasingly so. The trades have developed around the materials used and the technologies employed, and they have increased in variety and complexity. Development in industry and commerce has led to a demand for newer and more complex types of building, which has in hem. Notably the usage of buildings has changed to incorporate new information technology and communication systems, but also the process of building has changed with the shift of emphasis from fabrication on site, to fabrication in a factory, and the assembly of components on site.

Historically, apprenticeship was the principal means of training skilled and semi-skilled workers, and indeed many professional workers. The system of apprenticeship has taken many shapes and has evolved in line with production practice. At its simplest, it remains the predominant mode of acquisition of semi-skilled trades, craft and occupations.
A new entrant to construction industry would be taught by a skilled tradesman in the workplace. A trainee would progress to become a craftsman's mate (known as improver), then a craftsman and then a master craftsman in the course of time. The individual throughout their career would follow a specific trade; their training would take a long time, and would typically be in excess of ten years. This has partly been a contributing factor to the segregation of trades. Traditionally there have been five main trades:

1) The carpenter.
2) The bricklayer.
3) The plasterer.
4) The plumber.
5) The electrician.

One might add the 'painter' to this list. These trades have become as strong as they are common to a large proportion of all projects and have been so far a very long time. They involve the use of some of the oldest and best-known materials. Since the Second World War, many new materials, and technologies have been used on a regular basis, and some trades have emerged as dominant in modern construction such as the steel worker, the dry liner, and a whole range of specialists have also involved in the complex building services now being used in many modern buildings. There are very strong demarcations in the U.K construction industry. These demarcations lead to areas of work being 'territorial' to the skilled worker, and consequently the boundaries are hard to cross for both the employer and the employee. Clark and Wall (1996) have explained this:

"The content of each trade rests on claims to particular activities which are socially recognized or agreed by industrial partners and consequently incorporated into training programmes."

Demarcation has been 'agreed' upon and reinforced by training courses, qualification/certification schemes and the increase in self-employment and labour only sub-contracting, which has been prevalent in the construction industry since the 1970's. An employer will now sub-contract out a specific job to a specialist firm, having a number of firms working within their respective field on the same project. They work side by side, and there is a person to work outside of their field because there is a person employed by another firm to do that job, thus the boundaries are reinforced. Another reason for demarcating being so strong could be this: Clarke (1992) talks of individuals pride in their work as part of building as a social process, associating "solving difficult and varied problems and achieving proficiency through knowledge and experience of trade" with the organization of labour. The specialization would lead to recognition of the individual, which is a human need.
The significance of the Construction Industry Board (CITB) in U.K is important in the historical development of skills training. The CITB was set up by statute to oversee training provision for industry. Its current role is to act as a managing agent for the various disciplines of the construction industry at both trade and professional levels. Macneil (1996) states that the two main functions of the CITB are:

1) To estimate how many trainees the industry will require in the future.
2) To introduce the trainee, the training provider, and the employer to each other.

It is funded by a levy raised against all those firms with an annual payroll of £61,000 or more, although it does not hold any funds for training courses itself. The training funds are held by the Training and Enterprise Councils (TEC's) who actually run the courses. The CITB run a limited number of courses itself, but has to persuade the TEC's to fund the course it puts forward. The position of the CITB is a key player in the construction industry.

As a final point on the historical aspects it is necessary to point out that construction training has broken away from the firm and has become a nationally based system. Apprenticeships have declined as the amount of training in government supported further education colleges has increased. The implications of this are that the umbrella system now covers every firm and every region in the U.K. This vast range of trades and skills are to be covered in a large, complex, and diverse industry. The centralized training system thus has a large number of people, firms, circumstances and interests to be responsibly and considerately provided for.

5.15 The Development of Building Craft Skills

Hatchett (1982, p.2-14) argued that, craft skill development has been seen as a direct means of increasing the productivity of a labour-intensive industry. Craft apprenticeship within the construction industry has had a long tradition, and consequently it has developed certain entrenched characteristics. Apprenticeships have become historically linked with the initial entry of young people to a limited number of manual occupations. Traditional patterns of behaviour have been developed in association with work experience, industrial training and further education provisions considered appropriate to new entrants to the industry.

Bedale et al. (1980, p. 64) stated that, it is important to make clear that skill is a dynamic not a static concept, by adding some comments on the use of the terms "skill" and "skilled".
a) Skill is not just a technical concept, concerning the level and the type of tasks, which can be done; it involves social and ideological aspects.

b) Skill involves control- planning, conceptual and decision making, working to and interpreting specifications, knowledge of the process and what is being produced.

c) Skill involves diagnosis, especially with regard to maintenance. In this respect, work study schemes mean that assessment of a job is taken out of the workers’ hands and mean that the management control the work done, the speed of work, etc

d) Skill involves the use of tools or machines to aid manual ability or dexterity, as opposed to the situation where the operative is just an ‘extension’ to a machine, and capital controls the work through that machine.

e) Skill and trade are not synonymous. A trade (e.g. carpenter, fitter) involves a range of skill: these skills may change, but the name of the trade can remain the same, and the classification of ‘skilled’ may or may not be retained.

f) (Re) classification or retention of the label 'skilled' or 'semi skilled' depends on struggle. Some jobs which involve tasks similar to those which in other industries (or even in the same industry) are classified as semi- skilled retain the 'skilled' classification, or vice versa.

5.16 The Modern Role of Skills Training

Despite advances in the mechanization of the building process, the industry is still highly labour-intensive. Changes in technology have generally resulted in a shift from traditional craft skills towards engineering and assembly. The main areas of technological changes are:-

- Information technology
- Mechanization
- Prefabrication
- New materials

Mechanization is occurring through the development of hand held power tools and larger items. Pre-fabrication modular components in the firm of large assemblies and smaller sub-systems are used extensively in the commercial sector.

The range of new materials entering construction markets present difficulties in making appropriate choices: such choices often require new skills and knowledge.
The demands for skills in the modern construction industry somewhat differ from those of earlier days. Baldry (1981) identifies a hierarchy of levels of general and specific job knowledge required of the construction operatives, these levels are:

1) Knowledge of complete theory which requires the ability to predict, identify and resolve the problems relating to the work,
2) Knowledge of operating principles, which requires the ability to explain why, when and what must be done at each step; in the job,
3) Knowledge of procedure, which requires the naming of stages in craft and the ability to tell how it is done,
4) Knowledge of nomenclature, which requires the ability to identify tools, materials, parts, processes and simple facts about the craft.

The most modern aspects of skills training are that of multi-skilling. The CIB (1998) strategic review refers to the need for 'systemic skills' and defines them as:

"The ability to comprehend the relationship between one area of work and another- to be able to think and act systemically with regard to problems."

This was further supported in the report by the explanation that thinking about both the other work going on around you and the work outside of the immediate vicinity, such as off-site prefabrication and design decisions, is invaluable in achieving success. Clarke and Wall (1998) identified the area of the multi-skilling as having three characteristics form:

1) The broadly skilled operative with a wide range of skills.
2) The operative with a core skill but with additional skills 'bolted on'.
3) The 'Jack of all trades', with superficial knowledge across a wide area no skill of any depth.

Although multi-skilling is essential in some areas, such as carpenters knowing how to lay bricks or paint for certain areas or the bricklayer knowing how to fix a window frames to speed his work, increased specialize is becoming essential in building services area where technology is at high level. Therefore, it becomes apparent that the need for multi-skilling is changeable between industry sectors, but remains an essential issue as the operative will either move towards it or away from it, depending upon which sector they work in, for example, services specializing more and wet trades becoming more multi-skilling.

A change in the balance of skills is also occurring within the industry. The CIB strategic review (1998) identified the following key point:
"Sophisticated construction products and processes are increasing the needs for technical knowledge and skills. There are trends towards measurement, alignment and fixing skills and away from manual, mixing and cutting skills."

The introduction of prefabricated components from internal finishes to entire rooms has had a dramatic impact. Gibb (1994) proposes that the production environment of the factory is preferred as it is more controllable in the terms of resource allocation and quality than the construction site. The 'wet trades' are thus decreasing as brick/block work, plastering, and painting are being superseded by the new components.

The modern skills training scheme must therefore account for this trend in the shift of emphasis in construction skills. One very large issue relating to modern skills training is the people to whom it will apply. The trainee base is very important, and some demographic changes are having a noticeable effect on the construction training issue. In the U.K it has been noticed that there were fewer births in the early-mid 1970's, and so there are fewer people of traditional age for entering the trades, which are sixteen. The majorities are in education until the age of eighteen, and a significant number continues after that. Therefore the recruitment area for the construction has changed, and so modern training must reflect that. The new entrants to construction are older and the number of adult trainees is on the increase. A CITB (1988) report found that industry employers had an old ideology that the best new entrants are 16 years olds, fresh from school. Modern skills training must, according to the CITB report, bear in mind the following points- the new entrants are older, the new entrants have had more education and adult trainees are increasing in number, with the additional factor or the need to learn new skills associated with new technology.

5.17 Skill Shortage in Building Industry

Latham (1994) report has identified the need to improve productivity and efficiency levels in construction, and suggested that a 30% reduction could be achieved by the year 2000. To achieve this target, in any meaningful way, the 'right' skills and knowledge base for construction personnel is paramount. The U.K. Technology Foresight report (OST, 1995) in looking at the challenges facing the construction industry emphasized the importance of the acquisition of relevant skills, knowledge, and competencies for the future through appropriate education and training. In England serious skill shortages were prevalent during the construction boom in the 1980's. Key players and firms in the industry indicated the re-emergency of skill shortages in a number of "traditional" construction craft trades, such as carpentry, brickwork and plumbing, as well as newer areas such as the
installation of electronic control systems in building services. An indication of the problems with the quality of skills is shown by lower levels of productivity and higher levels of supervision in British construction compared with those in other major West European countries.

Fluctuations in output make it difficult to individual firms to plan labour requirements skill shortages and the unpredictable skill levels of the workforce adversely affect the industry. Firms suffer if they cannot resource projects with an adequate supply of skilled labour: construction cost rise, supervision increase, accidents may occur and delays ensure the reducing of profitability and competitiveness. Highly skilled operatives may also leave the industry due to irregular employment, resulting in a waste of training and other resources.

60% of US companies surveyed by the Business Roundtable (1977) reported difficulties recruiting and training their skilled force. One possible cause for the skilled workforce shortage may be significant long-term decline in real wages in construction in the USA, especially the decline in real wages for entry-level workers (Allonon et al., 2000; Oppedahh, 2000). The unattractive image of work in the construction industry makes it difficult to recruit new workers, and the lack of opportunities for training and career growth leads to high turnover rates (Business Roundtable, 1977; Liska, 1998). Certainly some of these declines could be related to the labour shift in the US construction sector in the last 30 years from approximately 70% of the work conducted by organized labour to the current amount of about 20% (CPWR, 1998).

New labour shortages have been suggested to address the above concerns, and much more efficient use of existing craft workers. Multiskilling is one of these strategies where workers posses a range of skills allowing them to participate in more than one work process. Multiskilled workers may have a primary craft in which they are highly proficient, but their role in construction project is not limited to that craft. Traditional rigid craft boundaries can be blurred or eliminated, and workers are allowed and expected to work in various crafts as long as the task is performed proficiently and safely (Stanely, 1997). A small percent may have full proficiency in two or three crafts, and they would be termed multi-craft workers by some companies. Previous research demonstrated the benefit of multi-skilling, including a potential 5-20% labour cost saving a 35% reduction in required total hire, a 47% increase in average employment duration for workers per project, and an increase in earning potential for multi-skilling for multi-skilling workers (Burlison, 1998). Another field of studies identified other workers benefits including better qualification
resulting in increased employability and increased job satisfaction (Stanely, 1997; Carley, 1999). Related research has confirmed the positive impacts of multi-skilling on projects to also include improved quality, improved safety, and the added flexibility in assessing tasks by field managers (Williamson, 1992; Cross, 1996). One study based on an extensive survey concluded that workers with more skills do earn a higher annual income (Carley, 1999).

Multiskilling impose a number of requirements in order to achieve its benefits. Multiskilling require more and border training than traditional labour strategies for the segment of the workforce that is multi-skilled. Furthermore, to benefit from multi-skilling, changes in companies’ management systems and structures required. Many construction workers in the USA do not consider construction as a career, but as a source of paycheck. The perception is partly due to a lack of organizational investment, lack of promotional opportunities, and the cycle nature of the construction industry (Rowings and Federle, 1996).

It was found in the study that multi-skilling gives workers more possibilities to advance and develop a career path. Also, multi-skilled workers improve their opportunities of remaining steadily employed within the same geographic region. Often multi-skilling allows workers to maintain a good job even if it develops physical limitation (Burton interview). Finally, multi-skilling may increase workers motivation by increasing productivity and encouraging greater participation and engagement in the work process.

5.18 Workers' Attitudes and Behavior

Attitudes represent peoples’ evaluations of objects or situations that predispose them to behave in a certain way (Rokeach, 1972; Ajzen, 1983). It is widely accepted that an attitude has four dimensions, namely 'effective' (feeling/emotions), 'behavioral' (intentions/actions), 'cognitive' (knowledge/beliefs), and 'evaluative' (values/likes or dislikes). People form attitudes because they help to give structure and priority to a complex world, providing some degree of consistency and clarity in an individual's explanation and interpretation of objects and situations (Olson and Zanna, 1993). Attitudes are valuable also in enhancing a person's self esteem, that being a defense mechanism to protect them from feelings of insecurity and inferiority, particularly in times of conflict. Finally, attitudes serve to express an individual's self-identity and guiding values. They are important to managers because they determine the direction of people's behaviour in
response to a particular stimulus, and provide insights into appropriate motivating mechanisms.

Managers need to understand how attitudes are formed if they are to manage them. Researchers indicated that attitudes are shaped over time and change according to a variety of factors, the most powerful of which is an individual's personal experiences of a situation or object (Malim, 1997). Other determination includes the generational 'cohort' effect, which refers to the attitudes acquired from growing up in a particular historical socio/economic/political environment. Additionally, parents and families are important in shaping attitudes, because they exercise extensive control over the information a person receives in their most formative years (McGuire, 1985). More generally, the community at large has an important influence on attitudes, through the imposition of social norms that can invoke a sense of morals obligation towards society (Bratt, 1999). In a work context, workmates can exert a significant over attitudes through peer pressure, and by determining acceptance into a group that provides security needs (Robbins et al. 1994). Indeed, different occupations tend to develop different 'cultures' which can further influence attitudes by defining a member's role and status in that society, and expectations of certain behaviour. The workers in the construction industry are generally perceived to have very negative and wasteful attitudes towards the environment (Barrie, 1999). Such occupational cultures are shaped largely by people's common educational background, which determines their access to information about a particular issue. Environmental consciousness has traditionally not been taught as part of educational programmes for professions in the construction industry. However, in modern times, this lack of education about the environment has been counteracted by the most powerful modern influence upon people's environment attitudes: the 'mass media' (Chan, 1998). In an investigation of the media's influence over environmental attitudes, The Roger Organization (1990) found that the order of influence was TV (75%), newspapers (65%) and radio (39%). Finally, laws also are a shaper of people's attitudes, by dictating their perceptions of what is right and wrong in society's eyes. Indeed, stricter legislation is currently being seen as the way to moderate the wasteful practices of many industries such as construction.

The relation between attitudes and behaviour is far from conclusive, and a number of theories have emerged to explain it. Most prominent within environmental research are: norm-activation theory (Schwartz, 1977), the ipsative theory of behaviour (Frey, 1988) and the theory of planned behaviour (Ajzen, 1993). Schwartz's norm-activation theory asserts that environmental consciousness depends directly on altruistic moral norms rather than
on general environmental concerns. People feel a sense of moral obligation if they expect serious negative outcomes for other people, and if they fell responsible for ameliorating these consequences. While valuable, this theory reduces explanations of behaviour to a dispositional level, and does not accommodate the many other mediating influences upon operatives' attitudes towards waste, such industry culture and project constraints. By contrast, the ipsative theory of behaviour (Frey, 1988) goes beyond personal attributes in determining attitudes and behaviour, focusing upon how intervening factors such as resource constraints can prevent pro-environmental attitudes being expressed in people's behaviour.

Unfortunately, however, it has been widely criticized for ignoring social influences in environmental behaviour, and has remained largely untested in the environmental arena. This cannot be said about the theory of planned behaviour (Ajzen, 1993), depicted in Fig. 20, which has been widely tested and refined, providing many new insights into the full range of factors influencing people's behaviour in an environmental context (Hamid and Cheng, 1995; Taylor and Todd, 1995; Chan, 1998; Harland et al. 1999).

![Fig. 20 The Theory of Planned Behavioral (source: Ajzen, 1993, p. 182)](image)

Central to the theory of planned behaviour is the 'behavioral intention' of an individual, which reflects how motivated he/she is to behave in a certain way. This is determined by three factors: attitudinal, social, and perceptual. The attitudinal factor is based on an individual's positive or negative evaluation of a particular type of behaviour, and is based upon personal beliefs or knowledge about the outcome flowing from it. The social factor reflects an individual's sense of social pressure to behave in a certain way, and in the model it is referred to as 'subjective norms'. The perceptual factor refers to an
individual's perception of the ease or difficulty of performing the type of behaviour, and reflects past experiences as well as anticipated obstacles to doing so. In the model, it is referred to as 'perceived behavioral control'.

Birchall (1977/78, p.6) argued that:

"Man is a complex being whose behaviour is not predictable from simplistic models of motivation."

The problem facing the manager is that of creating situations within the organizations, which lead to subordinates contributing to the limit of their capabilities. Whilst the manager will seek high job performance, individuals will seek maximization of their own benefit, including both extrinsic rewards (e.g. financial) and extrinsic rewards (e.g. feeling of satisfaction). If the rewards offered are perceived inequitable the individual will take steps to remedy the inequity. This may take the form of demands for increased reward, a reduction in effort or, where alternative employment opportunities exist, exit from the organization. However, there is a tendency for the assumption to be made that satisfaction of the worker's needs will result in high performance. It is often anticipated that satisfied workers will behave in a way which meets organizational objectives. Research has questioned the validity of this assumption even to the point of supporting the theory that high performance leads to job satisfaction rather than vice versa.

In most cases it will be clear to the observer of work group that performance of individual workers varies. The rate of working and the quality of output will differ. This results not only from differences in the level of motivation, but also from individual differences in skills and abilities, and in order to improve performance the following steps may be taken:

(a) Improve selection so that skills and abilities better match job requirements.
(b) Undertake more thorough training in order to develop worker skills and abilities.
(c) Restructure the worker in order to get a better match between job requirements and existing worker skills and abilities.

Job performance, therefore, is influenced by more factors than simply the level of worker motivation. Difficulties also exist in defining 'job satisfaction' and consequently the means to be employed for its measurement. Also individuals may well be satisfied with certain facets of the job but dissatisfied with others, e.g. high pay for boring work. Overall job satisfaction appears to result from a combination of facet satisfactions. The situation is dynamic and workers will place different emphases on these various aspects at different times. Daniel (1973) suggested that extrinsic and not intrinsic rewards are of particular interest at other times.
Following an examination of research into the relationship between satisfaction and performance, Schwab and Cummings (1970) concluded that little is known about the nature of the two concepts at this time for further research at this stage to be valued. In a later paper Greene (1972) concluded that recent research findings rejected the idea that satisfaction caused performance, whilst they offered only moderate support for the suggestion that performance satisfaction. He said that the evidence is a more complex relationship, i.e.

a) Rewards constitute a more direct cause of satisfaction than does performance.

b) Rewards based on current performance (and not satisfaction) cause subsequent performance.

For the manager wishing to raise the level of subordinate's contribution the task is more difficult. As indicated earlier, high performance is determined in part by the skills and abilities possessed. In addition there may be obstacles which stand in the way of successful task performance. Finally, there is the complexity of the relationship between performance and rewards. An employee will exert high-level effort when he associates valued rewards with performance and also expects that high levels of effort will lead him to achieving high performance. The extent to which he expects high effort to lead to achievement is a function of his confidence in his own abilities, his perceptions of the difficulty of the task, and his view of the presence of performance obstacles.

Well-designing training should assist in increasing confidence and establishing more realistic views of task difficulty. The design of the job i.e. contents, work methods and relationships of jobs, has an important impact upon employee motivation and contribution. Important attributes of jobs are variety, responsibility, and influence in decision-making, control and social opportunities. Where the work-group has responsibility for planning, doing and evaluating an activity, which in itself is a complete entity, the worker can have a more intrinsically satisfying job.

The possession of the appropriate skills and knowledge does not always guarantee appropriate action. It is the operative's attitudes, which have been molded mainly through emotional experiences that direct and energizes his actions. Out of an almost endless list, Baynes, M. (1975) specified the following types of attitudes as particularly significant:

1) Attitudes towards project and its members,
2) Attitudes towards the individual's role,
3) Attitudes towards action.
Changes in attitude or the acquisition of new values cannot be measured directly; they have to be inferred from any resulting behaviour. Thus, they are closer to knowledge than skill in this typology.

According to Baynes (1975), the ability of an individual to perform, is the function of the above of the three variables: skills, knowledge and attitudes. Baldry (1981) provides as useful hierarchical typologies of the general and specific ability reheired of the construction operatives. These typologies are:

1) Ability to evaluate: the job requires ability to analyze, operating conditions, and make informed decisions about the activities;
2) Analytical ability: the job requires an ability to analyze facts and principles and to draw conclusions from observations;
3) The job requires the ability to explain relationship between basic facts, and to state general principles of construction;
4) The job requires simply the ability to identify basic facts and terms about the construction work-place area.

5.19 The Main Variables of Organization of Motivational Subsystem as Conclusion

The study has been given an increasing interest in examining the links between Managerial Activities (variable 1.1) and System Performance (variable 9.1), considering the link in a construction context and has argue that there is an absolute necessity to place HRM (Human Resource Management) issues at the center of decision-making.

The function of Human Resource Management (HRM) as secondary variable (variable 3.1) is considered a core Managerial Activities as a primary variable (variable 2.1), rather than a specialist support function, and is considered good practice for anyone with managerial responsibility to be involved with employee management issues (Cornelius, 2001).

The Organization of Motivational Subsystem (variable 1.2) is a managerial activities as Buchman and Huczynski (1991) define motivation as: ‘Motivation on the other hand is a decision-making process through which the individual chooses desired outcomes and sets in motion the behaviors appropriate to acquiring them’. Also Naoum (2001) summarized the management factors that influence employee motivation such as: ‘(i) management/leadership style and, (ii) human resource management.’

Therefore, the Organization of Motivational Subsystem (variable 2.2) as primary variable will cause an affect on Human Resource Management (HRM) as secondary
variable (variable 3.1). Also, the Organization of Motivational Subsystem (variable 2.2) will cause an affect on Motivation Technique (variable 4.3), Job design & Characteristic (variable 4.4), Working Condition (variable 4.5), Working Environment (variable 4.7), and Human Resource Information (variable 4.9) as intervening variables, coinciding with Reif (1973) defining the term (Job Design) as follows: "Job enrichment is concerned with designing jobs that include a greater variety of work content, require a higher level of knowledge and skills, give the worker more autonomy and responsibility for planning, directing, and controlling his job, and provide the opportunities for personal growth and meaningful work experience." Also, Naoum (2001) summarized the factors that influence employee motivation: 'Organizational characteristics: (i) job characteristics, (ii) structure and job design, (iii) quality of work environment, (iv) communication (group cohesiveness).'

Motivation Technique (variable 4.3), Job design & Characteristic (variable 4.4), Working Condition (variable 4.5), Working Environment (variable 4.7), and Human Resource Information (variable 4.9) as intervening variables, will cause an affect on Recruitment (variable 5.1), Selection (variable 5.2), and Training and Development (variable 5.3), as intervening variables.

A definition of 'motivation' as presented by Jones (1955 pp 1-8) will be adopted here to identify that behaviour can be directed by Recruitment (variable 5.1), Selection (variable 5.2), and Training and Development (variable 5.3): '... How behaviour gets started, is energized, is sustained, is directed, is stopped, and what kind of subjective reaction is present in the organism while all this is going on...', Also, Kempner (1987) defines motivation as 'the process of initiating and directing behaviour.'

The object of Training and Development (variable 5.3) is to alter the behaviour of employees in a way that will create improvements in the achievement of organizational goals. It provide opportunities for an employee to learn job-related skills (variable 6.1), help people to acquire Knowledge (variable 6.2), changes in individual Ability (variable 6.3), and changes Attitudes (variable 6.4). Knowledge, Skills and Abilities (KSAs), like motivation, are also internal factors that influence employee behaviour. Fishbein et al. (1975, p.216) define an attitude as follows: "it represents a person's general feeling of favorable or unfavorableness toward some stimulus object." Attitude also tends to be stable over time and is difficult to change (Staw et al. 1985). Edwin (1972) defines abilities as "general capacities related to the performance of a set of tasks." Abilities develop over time through the interaction of heredity and experience, and are long-lasting. Skills are similar to abilities, but differ in that they combine abilities that are developed as a result of training and experience" (Dunnette, 1976b). Skills are often categorized as 'psychomotor activities' (while abilities tend to be more cognitive) and are typically measured in terms of the ease and precision evident in the performance of some task (Goldstein, 1991). The term "skill" refers to an acquired
and practiced ability, or to a qualification needed to perform a job or certain task competently. Finally, knowledge is defined as the understanding of factors or principles related to a particular subject.

Focus on the improvement of the knowledge, skills and abilities (KSAs) of individuals. Harris (1996, p.10) argued that:

"Training involves a process of providing KSAs specific to particular task or job. Development activities, in contrast, have a long-term focus on preparing for future responsibilities while increasing the capacities of employees to perform their current job. Skill and technical training programs then narrow in scope to teach the new employee a particular skill or area of knowledge."

Encouraging employees to work in a way which leads to better-quality products and therefore a more positive organizational images demands that they are trained and developed in a way which strives to achieve quality improvements. Also, ensuring loyalty, motivation and commitment requires that people receive support and encouragement through training and development mechanisms, as Birchall (1977/78 pp. 1-8) argued that: 'whilst there is no one definition, there now appears to be a general agreement that 'motivation' is primarily concerned with:

(a) The forces which stimulate human behaviour,
(b) The forces which direct or channel such behaviour,
(c) The means by which this behaviour is maintained or sustained.'

Buchman and Huczynski (1991) define motives as 'learned influences on human behaviour that lead us to pursue particular goals because they are socially valued'.

In accordance changes in these four variables, Skill (variable 6.1), Knowledge (variable 6.2), individual Ability (variable 6.3) and Attitudes (variable 6.4) will cause changes in the following end result intervening variables:

a) **Highly motivated and satisfied worker**, variable 7.1, as Pigores and Mayers, 1969 (ed. Shaddad 1983) argued that: ‘...when employees are so well trained that they experience direct satisfactions associated with a sense of achievement and the knowledge that will develop their inherent capabilities at work’

b) **Competence worker**, variable 7.2, as ILO's report, 1998 stated that: "...retains a job, improves their productivity at work, and their income earning..."

c) **Healthy and safety worker**, variable 7.3, as Levitt et al. 1976 (ed. Shaddad, 1983) argued that: "...reduces accidents, increase output,”

d) **Low absenteeism and turnover**, variable 7.4, as Pigores et al. 1969, (ed. Shaddad, 1983) argued that: "...Dissatisfaction, complaints, absenteeism and turnover can be reduced..."

e) **Continuity of production**, variable 7.5, as King et al. 1964, (ed. Shaddad, 1983) argued that: "...reduces learning (cycle) time; this is almost the traditional result of improved training methods,”
f) Cost control and project effectiveness, variable 7.6, as Glueck 1974, (ed. Shaddad, 1983) “Training can reduce waste, and increases output...”

g) High quality of production, variable 7.7, as De Simon 1966, (ed. Shaddad, 1983) argued that: “Better quality is often quoted as a benefit of improved training method...” and

h) Machine utilization, variable 7.8, as Shaddad (1983) argued that: “improving the ability of an operator can affect machine utilization”

Consequently these changes will affect the end result Efficiency variable 8.1, Effectiveness variable 8.2, and Competence variable 8.3, and the end result variable which is System Performance, variable 9.1, as Martin et al. (2003) stated that: "...where those industries which invest in training tend to perform better and have a more positive public image than those which do not".

The general and task Environmental Subsystem, variable 2.3, will influence every variable in the system.
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CHAPTER 6

THE ENVIRONMENTAL AND STRUCTURAL SUBSYSTEM AND ITS AFFECT ON HUMAN RESOURCES DEVELOPMENT

6.1 Introduction

Organizations come in various sizes and shapes to perform specific functions. The function of organization can be classified as 'formal' and 'informal'. Within the context of formal and informal functions, the meaning of organization is to achieve certain objectives through collections of people and other resources. These resources are co-ordinate by a set of procedures and integrated by a form of organizational structure.

Bernard's (1983, p.73) classic definition of an organization is “a system of consciously coordinated activities or forces of two or more persons.”

In general, most 'formal' organizations have six common elements with their boundaries:

(a) The operation (task and technology),
(b) Objectives (visible and invisible products),
(c) Resources (human and non-human),
(d) Structure (formal and informal)
(e) Management (strategic and operational),
(f) Environment (internal and external).

Organization often manipulates events and people within their internal and external environment. Environmental forces, being economical, political, social, and technical, impose a great pressure on organizations to look for opportunities and plan or react to threats. The term ‘environment’ describes the circumstances and the external conditions that surround the organization and its projects at a particular period of time. These circumstance and conditions are separated by a ‘boundary’. The word ‘boundary’ as a conceptual term is important to define in the study of organization. It is at the boundary level that the input-transformation-output processes take place, and where the most rapid exchange, such as jobs and contracts, has to be handed. In general there are three types of boundaries: physical, sociological, and psychological boundaries.

Boundaries provide the following functions:

- Boundaries act as a filter between the organization and the environment.
- Boundaries act as a buffer between the zones (i.e. between the organization and its environment, and between the project and its organization).
**Fig. 21** shows that there are three environmental zones separated by line boundaries. These zones are known as:

- The external environment (macro level-zone 1)
- The organization environment (micro level-zone 2), including strategic and coordinative level
- The project environment (site/operation level-zone 3).

The zones shown in **Fig. 21** correspond closely to the management levels of the organization. At the core there is the operating or site management function. This is surrounded by layers of co-coordinative and strategic management sub-system, both providing 'lines of defense' and acting as 'buffers', each seeking to prevent the intrusion of environmental forces, protecting the central operating sub-system from any unwanted intrusions that might upset the efficient functioning of the operation core.

![Environment of the system](image)

**Fig. 21  An Organization and its Boundaries**  
*(Kast and Rosenzweig, 1981 p. 112)*

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Before the study reviews the other five subsystems, a concern about the managing the organization at its business level seems important at this stage. Strategic decision can be diffused throughout the organization over time, and therefore can have an impact on the operational decisions and the administrative decisions within the organization. In other words, effective strategic management creates a productive alliance between nature and the demands of the environment, the organization's culture, and values, and the resources that the organization has at its disposal.

There are 4 common characteristic of the external environment: (1) stability; (2) sophistication; (3) market diversity; and (4) hostility.

An organization's environment can range from stable and static to fluctuating and dynamic. In a stable condition, the environment is relatively straightforward to understand, and not undergoing significant changes. On the other hand, in dynamic conditions, the environment is unpredictable due to a variety of factors e.g. an unstable government or unexpected shifts in economy. Moreover, there are changes in contractual arrangements and a rapid change in advance technology. Thereafter, firms that operate under a dynamic environment must be prepared to cope with environmental forces, otherwise they risk being out of business. Naoum (2001) argued that this actually happened in the 1980s and 1990s when firms failed to recognize the need to change. The term change implies change in:

(a) The strategy of the firm,
(b) The design of the organization structure,
(c) Organization culture,
(d) People and organizational behaviour.

An organization's external environment can also range from less sophisticated (simple) to highly sophisticated (complex). The level of sophistication depends upon the characteristics of the firm, such as the type of products that it builds, the size of the company and the geographical location where it operates. In simple environment, knowledge can be rationalized, and building process can be broken down into comprehensively simple components. A complex environment requires a great deal of sophisticated knowledge about clients and their projects, the technology involved, the market, competition and much more.

There are two types of markets, integrated and diversified. An integrated market is that in which a contractor offers specialized services or products to certain types of clients. On the other hand, market diversity may result from a broad range of clients, products,
services, and geographical areas. Therefore, market diversity can affect organizational structure through an enforced change in strategy.

An organization's environment can range from munificent to hostile, and hostility is influenced by fierce competition, by the organization's relationship with other organizations, government, as well as by the availability of adequate resources to it. Naoum (2001) regarded the construction industry as hostile because of the highly competitive market. However, some construction firms managed to decrease the extent of hostility by diversifying their services through offering alternative contractual arrangements to remove the element of competition and foster long-term relationships with clients.

The external environment comprises the national and geographical conditions under which all organizations are operating. All organizations (irrespective of size) operate within the same culture and climate, and share the same environmental forces. These forces are commonly known as: (1) economical; (2) social; (3) political; and (4) technological, and (5) cultural.

6.2 The Influence of External Environment on Human Resources Development

The relationship between the construction industry and the general economy is very important because of three main characteristics that are associated with the construction industry. Hillebrandt (1997) identified them as follow:

- First, its size: the value of the final product of the construction in the U.K. is that amount to 12% of the gross domestic product. The total amount is about 6% of the labour force. These significant figures are not only applicable in the U.K. but they are also internationally acceptable, as a result of construction serving many parts of the economic it is therefore vulnerable to overall economic trends. The characteristics of building activity (i.e. long lead-lag times, large value contracts and heterogeneous organization and markets) mean that although individual projects or sectors may be severally influenced by fluctuation in the market, the influence on the industry as a whole is dampened.

- Second: construction is regarded as creating investment products, i.e. the new products which it creates are wanted, not for their own sake, but on account of goods or services which they can create or help to create. So, by virtue of the long life of construction products, the stock of products is large in relation to the annual production. Therefore, small fluctuations in the demand for the stock of buildings and
work will have very large repercussions on the demand for the buildings and works created by the industry.

- Third: the government is the main client for most of the construction work carried out in the industry as a whole. This has an important and far-reaching effect in the industry, and the economy because government has a means of very direct control over the demand on the industry.

Therefore, changes in the economic climate can have rather significant consequences on the corporate strategy and organizational development of construction firms. At the social and political level, decisions are made by the government on the priorities of investment. Programmes will affect the construction market, directly where expenditure cuts or changes in emphasis affect specific projects, and indirectly by influencing the level of demand for labor, materials, and other resources. This influence may also occur at the government level, and will affect both public and private sectors. Changes in the structure and needs of the community will create different demands for building. Moreover, demographic changes can alter the needs for housing, schools, and jobs. Alternations in the structure and tastes of society can also influence the type of facilities required.

6.3 Organization Culture as External Variable Affecting Human Resources Development

6.3.1 Introduction

The concept of culture was first known on top representing, in a very broad holistic sense, the qualities of any specific human group that are passed from one generation to the next. This includes religion, way of life, values and beliefs of people. This is known as 'social culture'. People born in a particular culture are expected to believe and behave differently from others. Similar to the social culture, each organization has its own culture dominated by its value and behaviour. This is known as organization culture and has been commonly defined as the way things are done and operated within the internal environment of the workplace. It has a number of features including: common beliefs, patterns of behaviour, norms, values, and rules that are exercised among members of the organization. These features are strategically derived and they are usually established through the company founders or the new managers (leaders). The closer the values and beliefs among member of the organization the stronger the culture. The following factors are examples of cultural matters related to organizations:

- The characteristics of the people employed by the organization,
- The level of qualifications required for professional employees,
The recruitment process.

Kotter et al. (1992), Scholy (1987), and William (1993) defined culture as:

- Rewards and promotion of employees,
- Training of employees,
- Social activities available,
- The system used for career development,
- Decision making level,
- The type of power that is exercised within the organization,
- How much risk the company takes,
- Line managers, involvement (or not) in strategic decisions,
- Subordinates’ awareness of company objectives,
- Subordinates awareness of company problems,
- The system of communication and co-ordination used,
- Information documentation system used.

**Fig. 22 The Three Dimension of Organizational Culture (Naoum, 2001)**

Now, we try to conclude these issues in a conceptual model:

(a) Social Culture: this refers to the way individuals behave, and the means in which people are motivated at work. It also includes social activities that take places within the organization e.g. "out of work" activities, such as sports and social clubs.
(b) Technical Culture: this means that organization has a culture related to the techniques used for executing the tasks, equipments, processes and any other facility which transfers inputs into outputs. Naturally the technique used depends on the characteristics of the task, which in turn affect the organizational structure and cultures.

(c) Managerial Culture: this includes the style of managerial and organizational structure. It refers to the way in which the tasks are divided (differential) and the manner in which activates are coordinated (integration). Differentiation and integration will create a pattern of power and authority within the organization, which in turn can be developed into a particular culture.

6.4 Literature Review of Organization Culture

Indeed, an examination of the literature is likely to conclude that organizational culture is one of the most popular concepts in the fields of management and organizational theory. One reflection of the popularity of the culture concept is the increasing number of theoretical perspectives (Martin, 1992) and organizational disciplines, which utilize the concept (Harris and Ogbonne, 1993). It is arguable that the academic acceptance of culture, without the usual squabbles and scepticism associated with new concepts, is a major indication of the perceived importance of concepts (Alvessen, 1990). However, this is not to infer that there is a consensus on the meaning and relevance of the concept. On the contrary, there is a widespread disagreement on the definition and scope of the organizational culture concept (Ogbonne and Harris, 1998a). Consequently, it is pertinent to note three main issues. First, many researchers note that treating culture as a unitary concept reduces its value as an analytic tool (Martin, 1992; Ogbonne and Harris, 1998a; Pettigrew, 1979). Second, culture cannot be equated to power and policies or climate (Denison, 1996; Riley, 1983; Schein; 1986); and, third, there is a disagreement on whether organizational culture can be easily changed (Legge, 1994; Ogbonne, 1993).

One of the major reasons for the widespread popularity of and interest in organizational culture stems from the argument (or assumption) that certain organizational cultures lead to superior organizational financial performance. Many academics and practitioners argue that the performance of an organization is dependent on the degree to which the values of the culture are widely shared, that is, 'strong' (Deal and Kennedy, 1982; Denison, 1990; Kotter and Heskett, 1992; Ouchi, 1981; Pascale, and Athos, 1981; Peters and Waterman, 1982). The claim that organizational culture is linked to
performance is founded on the perceived role that culture can play in generating competitive advantage (Scholz, 1987). Krefting and Frost (1985) suggested that the way in which organizational culture may create competitive advantage is by defining the boundaries of the organization in a manner which facilities individual interaction and/or by limiting the scope of information processing to appropriate levels. Similarly, it is argued that widely shared and strongly held values enable management to predict employee reaction to certain strategic options, thereby minimizing the scope for undesired consequences (Ogbonne, 1993). Theories also argued that sustainable competitive advantages arise from the creation of organizational competencies, which are both superior and imperfectly imitable by competitors (Reed and DeFillippi, 1990). To this end, it is argued that the 'uniqueness quality' of organizational culture makes it a potentially powerful source of generating advantages over competitors. Indeed, many commentators have advised organizations and researchers to exploit the multiple advantages which could be offered by culture rather than focusing on the more tangible side of the organization (Johnson, 1992; Prahalad and Bettis, 1986).

Early researchers who link culture to organizational performance are unequivocal in their claims. An illustration of this is derived from the works of the so-called 'excellence writers' who argued that successful organizations are distinguished by their ability to promote culture values which are consistent with their chosen strategies (Deal, and Kennedy, 1982; Ouchi, 1981; Pascale and Athos, 1981; Peters and Waterman, 1982). Although this view was met with initial popularity, the principal tenets of the argument have been subjected to extensive criticism (Legge, 1994; Ogbonna, 1993; Willmott, 1993).

By the 1990s, the researchers assessing the links between culture and performance were more cautious. Gordon and DiTomaso (1992) and Denison (1990) both proposed that there is a link between certain culture characteristics and performance, but each add a number of provisos. In particular, they note that culture will remain linked with superior performance only if the culture is able to adapt to changes in environmental conditions. Furthermore, the culture must not only be strong (widely shared), but it must also have unique qualities which cannot be imitated. However, more recently, it has suggested that the relationship between culture and performance is tenuous (Hopfl et al. 1992; Lewis, 1994; Lim, 1995; Ray, 1986; Willmott, 1993). Indeed, the growing popularity of the resource-based view of competitive advantage suggests that the degree to which a culture can be theorized to determine a sustainable advantage is dependent upon the value, rarity, limitability, and sustainability of the culture concerned (Barney, 1986, 1991).
Overall, the literature on organizational culture is rich and diverse. Much of the richness is founded on the claim by many researchers that culture is linked to organizational performance. While some theories have questioned the universality of a culture-performance link, sufficient evidence exists to suggest that organizational culture is associated with organizational performance.

6.5 The Effect of Culture in Construction Industry

In order for organizations to survive the external pressures of the environment, they need to continuously change their culture to fit the environment in which they operate. Changing culture is usually associated with changing strategy, and a change in strategy requires a change in organizational objectives, work methods, structures, systems, training and eventually, people’s values and behaviour. The term value in a cultural context refers to matters that are difficult to visualize and hard to change even when the group members change. On the other hand, the terms ‘people behaviour’ refers to matters that are more visible and easier to change—matters in which new employees are encouraged to follow their fellow workers. In addition to social and organizational culture, there is also an ‘industrial culture’ where certain patterns of attitude and beliefs dominate the behaviour of its people. The fragmented nature of the construction industry, where design is separated from construction and a large proportion of the work is sub-contracted, means that there is ‘cultural diversity’ among the different firms engaged on any given project. This point was expressed by Michael Latham (1993), who stated that construction suffers from a culture of confrontation. He reported:

“I found a general mood of change. It is widely acknowledged that the industry has deeply ingrained adversarial attitudes. Many believe that they have intensified in recent years. There are also general agreements that the route to seeking advice and action from lawyers is embarked upon too readily. While a relatively small number of these legal disputes actually reach formal court hearings, the culture of conflict seemed to be embedded and the tendency towards litigiousness is growing. These disputes and conflicts have taken their toll on morale and team spirit. Defensive attitudes are commonplace. A new profession of ‘claims consultants’ has arisen whose duty is to advise some participants in the construction process how they should seek to make money out of alleged mistakes or shortcomings of their participants. While clearly the existing culture of claims provides its own justification for such services, it is difficult to image a starker illustration of adversarial arrangements within the construction process itself.”
6.6 Organization of Structural Subsystem as Major Variable Affecting Human Resources Management

6.6.1 Introduction

The third managerial sub-systems are the structural subsystem. The structural subsystem is a multi-dimensional concept. Campbell (1974) makes a distinction between structural and structuring variables of a system. He refers the structuring system to policy and activities occurring within the subsystem. The structural variables refer to the physical characteristics of subsystem. Structure follows strategy, and is defined as a mechanism for linking and coordinating people and groups together within the framework of their roles, authority, and power. If strategies establish the objectives of the organization and determines the direction in which the organization will go, then the structure facilitates the achievement of these objectives. Structure provides the framework of an organization and its pattern of management. It is by means of structure that the purpose and work of the organization is carried out (Chandler, 1966).

![Fig. 23 Model of Structure as a Variable (Naoum, 2001)]
Naoum (2001, p.76) defined organizational structure as:

“A mechanism for linking and coordinating people and group together within the framework of their roles authority, and power. Structure can be regarded as the backbone of the organization and its effectiveness depending on how strong or weak the skeleton is.”

Also, Koontz and Weihrich (1989) described organization structure as follows:

"Organization implies a formalized international structure of role or positions. Formal organization means the intentional structure of role in formally organized enterprise. Formal organization act as a network of personal and social relationships not established or required by the formal organization but arising spontaneously as people associate with one another.”

Every organization consists of individuals who are brought together to work as teams to perform specific tasks and achieve organizational and personnel objectives. Members of an organization teams are interconnected by set of rules and procedures with some kind of structural hierarchy. Within this hierarchy, there are two essential functions that link people together. These are:

(a) The 'task' function which refers to activities responsible for the actual execution of the building process.

(b) The 'element' function which refers to activities that are supportive to the task function but not directly related to the specific and definable ends.

Most construction work consists of one-off or small batch projects and therefore seems to fit into Woodward's (1958) unit and small batch technology group. Successful firms in this category tended to have shallower management hierarchies, with no manager very far from the production work. There were fewer administrative controls and small groups of skilled workers typified each firms. Such organizations were generally more flexible, and the ratio of oral to written communication was greater than in any other organization. This description suggests that construction is generally better served by flexible structures and procedures, a notion which appears to gain support from Burns and Stalker's research (1961). These researchers suggested that organizations that operate in unstable markets or technologies are generally more effective when organized along organic lines. Whilst many might argue that technological change is not rapid in the construction industry, few would dispute that industry's environment is changeable and uncertain. Demand for construction work fluctuates in response to economic changes, government measures, and availability of capital for long-term investment.
There is also evidence suggesting that structure can influence effectiveness, and in particular, the attitude and behaviour of the people working within the structure. This is in turn influences productivity and efficiency of the project (Channon study, 1978, and Lansley et al. research, 1974).

6.7 Principles of Organizational Structure

The design principles of organizational structure can affect the organization in two ways:

(a) Technically, where productivity and economic efficiency of the organization can be affected,

(b) Socially, where moral and job satisfaction of the employee can be affected.

Good organization does not by itself produce good performance, but a poor organizational structure makes good performance impossible, no matter how good the individual managers may be. Therefore, the design of the organizational structure should maintain the right balance of the socio-technical system. The relationship between these two systems, i.e. between structure and technological requirements of an organization and social factors and the needs of the human part must be strong (Drucker 1989, p.223).

The purpose of an organization structure is to help create an environment for human performance. It is then a management tool and not an end in itself, although the organization structure must be define the tasks to be done. So, the roles established must be designed in the light of the abilities and motivations of the people available.

Structure organization involves all the management processes such as:

a) Staffing: staffing involves filling, and keeping filled, the positions in the organization structure. This is done by identifying work-force requirements, inventorying the people available, and recruiting, selecting, placing, promoting, appraising, and training or otherwise developing both candidates and current job holders so that tasks are accomplished effectively and efficiently.

b) Leading: leading is influencing people so that they will contribute to organization, and group goals; it has to do predominantly with interpersonal aspects of managing. All managers would agree that their most important problem arises from people-their desire, and attitudes, their behaviour as individuals and in groups- and that effective manager also need to be effective leaders. Since leadership implies follower ship and people tend to those who offer a means of satisfying their own needs, wishes, and
desires, it is understandable that leading involves motivation, leadership styles and approaches and communication.

c) Controlling: controlling is measuring and correcting individual and organization performance to ensure that events conform to plans. It involves measuring performance against goals and plans, showing where a deviation from standards exits, and helping to correct them and facilities the accomplishment of plans. Although planning must precede controlling, planning is not self-achieving. Plans guide managers in the use of resources to accomplish a specific goal; then activities are checked to determine whether they conform to the plans.

The formal structure as defined by Kast and Rosenzweig (1981, p. 198) is in terms of:

1) The pattern of relationship and duties- the organization chart plus job description or position guides,
2) The way in which the various activities or tasks are assigned to different departments and/or people in the organization (differential),
3) The way in which these separate activities or tasks are coordinated (integrated),
4) The power, status and hierarchical relationship within the organization (authority system),
5) The planned and formalized policies, procedures and controls that guides the activities and relationship of people in the organization (administrative system).

6.8 Application of Structure Principle to Construction Industry

Construction companies are often viewed as being unique in their organization. To some extent this view is accurate, because their work situations is unusual, almost invariable being centered around unique and geographically dispersed projects undertaken by a craft-based workforce (Anderson et al. 1981). Unfortunately, however, it also often leads to a situation where knowledge gained about organizations in general, and about the way they function, is either degraded or inaccurately applied with respect to contractor in the construction industry (Reinhait, 1983).

Researcher in construction management (Morris, 1983; Newcomb et al. 1991), have seen the system approach as one more suited to the construction industry. In particular the concept of an open system has become a popular model with which to conceptualize a construction firm or project with which interacts with the environment in which it operates. Morris (1972) also saw the key priority for increasing the effectiveness of
the construction process to lie in the management of the dynamic interrelationship between various organizations found on a building project.

The main area of difficulty is identified as the interdependence of design and construction and, hence, the emphasis is placed on the investigation of the patterns of coordination and control at the design-construct interface in different conditions of uncertainty and complexity. Morris (1972) stated that where there is uncertainty and complexity it will be helpful to design semi-autonomous organizational subsystems and to concentrate one's managerial attention on their interrelationships. However, this can produce highly fragmented subsystems on each side of the interface which would require more information processing for effective integration. Tatum (1983) used perspective and descriptive models distilled from decision-making theory to analyze data regarding how managers design project organizations. His objective was to provide knowledge about current practice to see whether it needs to be preserved or modified. The conclusions indicated frequent adoption of past structures, particularly when urgent situations force quick decisions. When data regarding the situation are available and time allows, decision making involves greater analysis and moves towards the contingency theory.

Tatum (1983) recognized that varying situations such as progression through the project life cycle, performance difficulties and changes in project goals demand a series of decisions regarding the appropriate configuration of structure. Therefore, relying heavily on the ideas presented by Thompson (1967), Tatum (1983) proposed a framework as a starting point for systematic decision making to custom design an organization according to specific project requirements. The proposed structuring process contains eight steps: define project objectives and set priorities, define line management organization, provide appropriate means for coordinative tasks, decide level of staffing and size of each unit, design staff groups, add planning and monitoring systems, locate decision making and delegate authority and, finally, define requirements for positions. Although the contractor's organization is considered as the unit of analysis, Tatum (1983) also referred to the importance of external influences and the need to locate the staff groups adjacent to the line segments for direct interaction, and to buffer the operating core from environmental disturbances.

Bennet and Fine (1980), in relating current organizational theory to the construction industry, emphasized the importance of the industry's distinctive features of fragmentation and temporary coalitions of specialist firms with sometimes divergent economic and social interests. In response to the requirement of creating a unique organization composed of
individuals and group drawn from a selection of various firms, the stated objectives are better achieved through an appropriate choice of contractual arrangements and project delivery systems.

Bennet and Fine (1980) expanded upon this macroscopic view to include in their theoretical premise that the choice of organization should be based on the analysis of the construction process, which is considered as a link between the project organization and the tasks performed. A simulation model is introduced to measure the effect of variation in size, production technology and predictability of the task, as major determinants of process, on the changes that can occur in the cost and duration of site activities. This move towards open systems analysis has produced a swing towards contingency or situational design of organization. This contingency view, emphasizing a complex interaction between the environment, the task, technology, human motivation and organizational structure, suggests that there is no one best way to organize or manage a construction organization or project. Previous research has examined various contingency variables in structure. Bryman et al. (1987) discussed the concept of ‘transience’ on the Least Preferred Co-Worker (LPC) - project performance relationship and concluded that the length of a project could well have an impact on relationship. Brenson (1990) offered a scholarly discourse on organizing construction. In this work he described organizational structure as being dependent upon combinations of external and internal variables. The external factors such resources, information, and specializations are embodied in the terms and conditions of contract which play a central role in the organizational structuring. The internal factors are combined with the external issues where construction organizations operating in competitive environments tend to tighten up their operational and administrative procedures. Firms operating in hostile contractual environments may be seen to structure project organizations to create buffers between the external environment and the project. The pervading research since the 1980s has been a quest for an understanding of how various parts of a project organization interact to encourage effectiveness in project management.

Naphapiet and Nahapiet (1982) saw three clusters of attributes shaping project performance: client attributes, project delivery processes and environmental conditions. Effective management of the interfaces between interdependent subcontractors generated success. Wich (1988), using a socio-technical systems approach, argued that all organizations have technical system comprising of work processes serviced by the social systems of personnel and group interaction. In construction, these systems operate within
single organizations but also across the boundaries of the firm. This need for unification of systems across a construction project leads to project management seeking to stabilize environmental and technological uncertainty.

One response to such uncertainties is for companies to combine centralized project reporting systems as unified across the construction firm, and project managers are given delegated authority to manage the technical process. A synthesis of these views would identify that the theorists have seen some common factors in organizational design. Woodward (1980) noted that technical methods were the primary factors in determining organizational form. This view was broadly supported by the work of Burns and Stalker (1961) who illustrated how different rates of change of product line (how different levels of environmental uncertainty) brought about by different organizational designs and differentiated mechanistic from organic structures. They argued that firms operating in stable environments impose quite different structural requirements from those operating in a more complex and rapidly changing environment.

Lawrence and Lorach (1967) continued to popularize the contingency view with their study of the structure and functioning of organization in a stable and dynamic environment. The linkage between technology and organizational structure is not universally recognized, and Thomas et al. (1983) argued that when there is technology uncertainty characterized by the use of dynamic and unstable technology then functional organizational structures need to be applied where authority is decentralized to the project. If authority is centralized to the head office then a matrix or project form (where the head office-based project manager has total authority) is most appropriate.

6.9 Organizational Effectiveness Criteria

Kreitner et al. (1999) considered four generic approaches to assessing an organization’s effectiveness. These effectiveness criteria apply equally well to large/small and to profit or non-profit organizations. Moreover, as denoted by the overlapping circles in Fig. 24, the four effectiveness criteria can be used in various combinations. The key thing to remember is that, Sherman et al. (1984, p.883) argued that:

“No single evaluation approaches the appropriate in all circumstances or to all organization types.”

Kreitner (1999) added that goal accomplishment is the most widely used effectiveness criterion. Effectiveness, relating to the criterion of goal accomplishment, is gauged by how well the organization meets or exceeds its goal. Brinkerhoff et al. (1990)
added: ‘it is also measured by productivity improvement,’ i.e. be comparing between inputs and outputs is a common organizations-level goal. Acquisition is the second measures of effectiveness, relating to inputs criterion rather than outputs. An organization is deemed effective if it acquires necessary factors of production, such as raw materials, labour, capital and managerial and technical expertise. The third criterion is the internal process, and sometimes they refer to it as the “healthy systems” approach. An organization is said to be a healthy system if information flows smoothly, and if loyalty, commitment, job satisfaction, and trust prevail among its employees. The last effectiveness criterion is the strategic constituents (or stakeholders) who generally have competing or conflicting interests. Strategic constituents or stakeholders can be identified systematically through stakeholder’s audit. A stakeholder audit enables management to identify significant impacts by the organization performances. (Kreitner et al. 1999)

![Four Ways to Assess Organizational Effectiveness](image)

**Fig. 24 Four Ways to Assess Organizational Effectiveness**

*Kreitner et al. (1999)*
6.10 The Impact of Variables to Organization Structure

Kreitner et al. (1999) stated that both contingency theories have one important thing in common: each is based on an environmental imperative “meaning the environment is said to be the primary determinant of effective organizational structure”. Other organization theorists disagree. They contend that factors such as the organization's core technology, size, and corporate strategy hold the key to organizational structure. Woodward's study (1965) found distinctly different structural patterns for effective and ineffective companies based on technologies of low, medium, or high complexity. Effective organization, with either low- or high-complexity technology tended to have an organic structure. Effective organizations based on a technology of medium complexity tended to have a mechanistic structure. Woodward (1965) concluded that technology was the overriding determinate of organizational structure. A comprehensive review of 50 studies conducted between 1965 and 1980 found six technology concepts and 140 technology-structure relationship (Fry, 1982, pp. 532-52).

A statistical analysis of those studies prompted the following conclusions:

- The more the technology requires interdependence between individuals and/or groups, the greater the need for integration (coordination),
- “As technology moves from routine to non routine, subunits adopt less formalized and [less] centralized structure (Fry, 1982, p. 548).

Size is an important structure variable subject to the schools of thought. According to the first school, economists have long extolled the virtues of the economies of scale. This approach is often called the “the bigger is better” model. The second school of thought pivots on the law of diminishing returns. Called the “the small is beautiful” model, this approach, contends that oversized organizations and subunits tend to be plagued by costly behaviour problems. Recent research suggest that when designing their organizations, managers should follow a middle ground between bigger is better and small is beautiful because both models have been oversold. Indeed a newer perspective says complexity not size is the central issue.

A meta-analysis of 31 studies (Gooding at el. 1985, pp. 462-81) conducted between 1931 and 1985 that related organizational size to performance found that:

- Large organizational (in terms of assets) tended to be more productive (in terms of sales and profit).
There were "no positive relationships between organizational size and efficiency, suggesting the absence of net economy of scale effect."

There were zero slightly negative relationship between subunits size and productivity and efficiency."

more recent study examined the organizational size and employee turnover over a period of 65 month. Turnover was unrelated to organizational size. (Benson et al., 1987, pp. 15-30)

The last variable is the strategic choice which also holds the key to organization structure. British sociologist John Child (1972) rejected the environmental imperative approach to organizational structure. He proposed a strategic choice model based on behavioral rather than rational economic principle. Child believed that structure resulted from a political process involving organizational power holders. According to the strategic model, structure is determined largely by dominant coalition of top-management strategists. In the same study of small and medium-sized companies, strategies and organizational structure were found highly independent. Strategy influenced structure and structure-influenced strategy. This was particularly true for large, more innovative, and more successful firms.

Strategic Choice theory and research taught managers at least two practical lessons. First, the environment is just one of many co-determinates of structure. Second, like any administrative process, organization design is subject to the byplays of interpersonal power and politics. The autonomy of an organization refers to the relationship between a focal organization and the parent organization. With regard to construction projects it is a measure of the extent to which decisions concerning suppliers, subcontractors, designers, information, etc. can be authoritatively made at a project. The Aston group (1969) treats autonomy as an organizational-structure dependent variable, rather than a contextual independent variable.

6.11 Organizational Structure in Construction Industry

In general, an organization's structure defines the way in which roles, responsibilities, power, authority and control are allocated amongst its workforce. Without a structure, an organization would have no basis on which to control and organize its work and manage interfaces with other organization. The basic form of organizational structure which characterizes the early construction organizations is the craft structure (Naoum, 2001: 89). These organizations are usually small and rely on an owner having centralized
power and direct control over most functions. Organizational members are expected to have a multitude of skills, and operations are flexible in order to cope with a lack of resources and the inevitable change that smaller companies have to endure in response to market pressures and the potential for growing the business.

Grenier (1998: p.58) proposed a model (Fig. 25) of organizational evolution which show how structures change as companies grow in size, which implies different approaches to managing human resources. He suggested that, initially, growth occurs through the creativity of the owner who exercises entrepreneurial skill and ability. However, as companies grow they need more robust organizational hierarchies to cope with the increasing need for decentralization in operating practices. As Greiner's models suggest, growth results in a crisis of leadership in which the owner is unable to maintain involvement in and control of every activity undertaken by the firm.

Greiner's (1998) suggested that most owners cope with this by restructuring the firm and arranging it into departments and functions with sections heads, the leader being providing overall direction. During this period, growth continues through the direction of the leader, and the HRM needs to become more complicated, with more staff and the need to maintain and develop specialist skills. However, HRM responsibilities tend to remain centralized. As the firm continues to grow, a crisis of autonomy arises, as the owner cannot maintain autocratic control over the operation of these departments and functions. The organization is now complicated, and the departments and functions are highly specialized. The leader is therefore unable to retain an overview of complex and rapidly changing situations, and there may be a need to create a separate HRM function with responsibility for these matters. Through this delegation the organization is able to continue to grow. However, as operation becomes increasingly complex and power is devolved, control issues emerge, and at the center, senior management experiences difficulty controlling the organization's performance: a crisis of control occurs. In response to this, organization implements measures to coordinate its activities, such as controlling budgets, formulating plans and procedures, and reviewing performance regularly. It is then that HRM policies might become formalized. However, further growth may lead to the development of an overly bureaucratic organization which is unable to be innovative or take the initiative. If this occurs, what Grenier terms a crisis of red tape occurs. The only way for the organization to continue to grow in such a circumstance is to adopt a more collaborative management style in which shared values, teamwork, cooperation, and creativity are fostered, thus preventing the stagnation of systems driven by red tape. In this
environment, HRM becomes hugely important as a way of motivating employees and breaking down barriers, stereotypes, and divisions which have developed at a personal level as the company has grown into competing divisions. In many ways this is a return to the philosophy that drove the craft structure.

![Fig. 25 Greiner's Model of Organizational Growth through Evolution and Revolution](image)

**Fig. 25 Greiner's Model of Organizational Growth through Evolution and Revolution**

Martin *et al.* (2003: p.60) suggested the type for organization operating in a project-based industry such as construction; the matrix structure has become the most common organizational form. The matrix structure effectively adds a lateral dimension to the line and staff structure, allowing the integration of previously disparate function for the purpose of specific projects. A project manager facilitates this integration. If a project needs to be resourced, then a project manager is selected, and draws from functional specialists in the various departments to make up the project team. This structure is ideal for organizations
operating in project-based industries where multidisciplinary teams have to be formed quickly and then rapidly disbanded and deployed elsewhere within the organization.

The matrix structure provides many advantages for the construction organization. Project teams are far more likely to comprise the necessary skills as people can be drawn from across the organization and not from a single operating division. Furthermore, it is flexible, as it facilitates individuals coming in and out of teams as required during the project’s development.

The formal structure of an organization is a framework of discipline, control, communication and co-ordination within which decisions are made, and problems are solved. Max Weber (1964-1920) characterized organizations by authority relationships within them. Weber classified authority structure as either ‘charismatic,’ ‘traditional or bureaucratic’. In ‘charismatic’ organization, authority is derived from the personal qualities of a dominant leader who is usually the founder. On the ‘death of the founder, his descendants may assume authority and the structure may then be considered ‘traditional’. A large-scale organization may have sophisticated authority structure which is based on rules, procedures, and office; Weber described such an organization as ‘bureaucratic’. Charismatic, traditional and bureaucratic organizations are ‘ideal types’, and any individual firm may be a mixture of all three.

A work organization may be considered as a system of activity operating on resources including people, materials, equipment, and finance. This system of activities is designed to solve the problems of production and to achieve certain objectives. Calvert (1976), states:

‘Organizing provides the framework of management the static structure upon which the succeeding executives, and supervisory functions can build in accordance with the policy principles determined by the directors’.

Lansley et al. (1975) assumed that an organization structure is not static; it is relatively dynamic in a feature that changes with the variation of work to be managed. They indicated that the problem of defining an organization framework arise from two distinct aspects: the problem of control (control is highly affected by the degree by which rules and regulations govern job activity and details), and the problem of integration (the degree of co-ordination between the different functional areas for the benefit of achieving the company objectives).

There are three factors, which can be thought of as influencing the degree of control: the type of work, the nature of the technology and the attitudes and values of the workforce. The first factor is the type of work. Managerial decisions about how long this job
should take, how it should be tackled, or what is a 'satisfactory' outcome, are all likely to be arbitrary and subjective. Although some managerial steps to control activities is essential, there will be limits to the degree to which it could be controlled; beyond these limits a control system may be largely self-defeating. In a job that an employee’s exercises judgment, initiatives, discretion or creativity, there is contained a significant level of unprogrammed work. Close control of activities performed become inappropriate.  

A second factor on control systems is the nature of technology employed. There are three stages of technological development: a) Pre-mechanization, where the work often requires a higher degree of crafting skill, b) Mechanization, which is reached when machines took over many production functions. In these circumstances, work becomes more specialized and repetitive and may, as in the building industry, reduce the work of some craftsmen to the level of assemblers or technicians. Large number of activities involved demands less judgment and attention at the same time. Control systems become appropriate as this process continue. Industrialized systems of building are examples of mechanization.

Integration must be considered according to its merits, and where work demands, individuals or departments work closely together, integration is obviously necessary. However, the nature of interdependence between various work activities can take a number of forms. It might be sequential as when 'B' cannot work until 'A' has completed his: the work of the bricklayer, carpenters, and plaster can be thought as sequentially dependent. In such a situation the achievement of high levels is not always easy since the interest of different individuals or group may conflict. Another form of interdependence is the kind involved in the teamwork, which calls for simultaneous integration; for instance where 'A' cannot perform his task without simultaneous co-operation of 'B', which is not so difficult to achieve, but where such activities are scattered on different sites and far away from the company headquarters, management often focus considerable problem in achieving satisfactory levels of integration. The third factor is the attitudes and values of the work forces equally potent in their influence on integration as on control. A difference in rank between two individuals can often vary as an obstacle to integration by barring full communication.

Similarly, status differences can lead to staff becoming pre-occupied with the protection of their vested interests rather than with co-operation.
The basis of informal groupings can also lead to problems in achieving integration. Where groups of workers performing similar skills are clustered together, they tend to build up a sense of identity which at times can be jealously guarded.\(^{(1)}\)

Co-operation between such functionally centered groups may be more difficult to bring about than where the criteria for membership are broader.

### 6.12 Influence of Management Style and Organization Structure on Human Resources Development

An important feature of the Channon's study (1978, pp. 23-25) is that it not only provides a useful way of thinking about the structure of a construction company and appropriate management style, but it also involves measuring the degree of control, integration, task orientation and people orientation. Lansley's research (1974) examined the relationship between organizational structure and management style and their influence on organizational effectiveness measured in both 'human' and 'financial' terms. Account has also been taken of related contextual factors such as 'task', 'size' and 'environment' of a company. The research used information collected from a sample of fifty small and medium-size printing and building firms. The authors elaborated a conceptual model involving the following independent attributes.

(a) Attributes related to organizational structure:

(i) integration-assessed by the extent to which the activities of the members of the management system are closely coordinated in relation to overall objectives.

(ii) control- assessed by the extent to which the activities of the members of the management system are laid down by higher authority and subject to close review on the one hand, or are more the result of the exercise of discretion and processes of discussion and consultation on the other hand.

(iii) environment- the extent to which the activities of the management system are concerned with the regulation of the internal affairs of the organization or with managing the organization's relationship with the environment.

(b) Attributes related to management style:

\(^{(1)}\) Where the nature of the task makes it more difficult to measure performance or to pinpoint 'ideal' methods, the activities are clearly less subject to control and can be described as 'unprogrammed'. An example of this kind of work is the activity of the architect or draughtsman engaged in a design problem.
(i) People orientation (employee-centered): managers focus on people rather than the job and recognize that their needs are not completely satisfied by monetary rewards, and

(ii) Task orientation (Job centered): managers focus on the task to be done, and operate through formal rules and procedures, clearly defined hierarchies, specialization, job separation, and top-down information system.

The criteria for measuring performance were grouped as follows:

(a) Performance in human terms:
   (i) Satisfaction - with job and company
   (ii) Information - the extent to which people perceived the communication system in the firm as effective
   (iii) Change - respondents' perceptions of the effectiveness with their firms managed change

(b) Performance in commercial terms:
   (i) Profitability - a combined measure based on return on capital employed and profit on turnover.
   (ii) Growth in sales turnover.

The study done by Lansley (1974, pp. 467-485), added further weight to the argument that there is no best way of organizing a business. Effective organization is contingent upon the purpose that organization is seeking to fulfill, and upon the nature of the tasks to be managed. Moreover the research also added to the evidence in favor of the view that the amount of uncertainty in the task is a key factor in determining the appropriateness of a particular organizational design. The extent to which managers receive specific (as distinct from general) guidance from such findings is, however, affected by two related problems. One is the difficulty of approximating the amount of uncertainty present in any given situation. The other is that uncertainty stems from many sources - the market, government legislation, the economic climate, the nature of the work and materials used, the technology employed and so on. The general proposition that the higher the uncertainty in the overall task the less appropriate is an organizational structure that is designed to achieve a high level of control over its members only goes so far. It does not help the individual manager. An amount of uncertainty present in the task facing his organization does not specify the form or organizational structure, which will lead to the achievement of a given level of control.
In this important sense, therefore, organization design must remain largely a matter of managerial judgment. Judgment will be better exercised in the framework of the kind of generalized knowledge and helpful insights produced by research of the kind carried out by Lansley et al. (1974, pp. 467-485). As a result of various forces, many organizations undergo relatively frequent structural changes. Many industrial organizations are accepting the necessity for changing their structure as a fact of life and as permanent establishments and departments charged with the responsibility for organizational analysis and planning. The movement towards dynamic, flexible structure and away from the rigid bureaucratic form seems to be a trend in modern organization instead of providing for permanent, structural positions. As characteristics of the stable-mechanistic system the adaptive-organic system has less structuring, more frequent change of positions and roles, and more dynamic interplay among the various functions.

6.13 The Structure Variables and its effect on Human Resources Development

In this part the study reviewed the various variables that affected the performance of the project:-

A) Nature and content of job: the process of defining work roles and relationship can be summarized under the concept of job design which seeks to specify the contents, methods, and relationships of particular roles in order to satisfy both organizational requirements and the needs of the individual job-holders. This means that the function of designing and specifying job roles must ensure that fulfilling and motivating positions are developed which accord with the strategic objectives of the organization. Armstrong (1991) identifies four factors which are important to effective job design: the process of intrinsic motivation; the characteristics of task structure; motivating characteristics of jobs; and the implications of group activity. In order to reconcile organizational and individual needs in relation to these factors, techniques such as job rotation, job enlargement, enrichment and empowerment can be used. Job design can also be as important tool in engendering organizational change (Torrington and Hall, 1995).

B) Integration and co-ordination between building team: writers such as Lawrence and Lorsch (1967), considered the concepts of differentiation (divisive forces) and integration (cohesive forces). They found that to ensure efficiency, the level of differentiation should be a direct reflection of environmental complexity, and also should be accompanied by an equivalent level of integrative effort. In these terms, it is
evident that, while the construction industry has differentiated in response to increase complexity (as seen in the growth of subcontracting and, more recently, professional diversity), it has struggled to provide necessary levels of integration to counter its adverse effects (NEDO, 1988; Latham, 1994; Egan, 1988). In theoretical terms, this is the challenge which faces the construction industry.

d) Employee resourcing: is also known as staffing function, forming one of the most challenging aspects of the HRM function. The major components of employee resourcing are recruitment and selection, deployment and team formation, performance management, retention and training, career development, dismissal and redundancy (Taylor, 1998). Employee resourcing activities aim to ensure that the right skills and competencies are in the right place at the right time. This inevitably results in a balancing act in which managers have to consider longer-term strategic considerations while providing immediate solutions for the short-term operational issues (Beardwell and Holden, 1997).

6.14 Working Group as a Variable Affecting Performance

6.14.1 Introduction

The design of organizational structure is associated with grouping people into units and sub-units to achieve individual and organizational objectives. A cohesive work group provides greater integration which leads to better co-ordination and managerial control.

![Fig. 26 Model of Work Group as a Variable (Naoum 2001)]
Having decided on an organizational strategy and designed a structure to fit the strategy, it is then important to form (or reform) the working groups within the divisions, departments and units. Group formation is a dynamic process, and can take place at any stage during the development of the organization. Group cohesiveness provides a high integration to the work process which leads to better co-ordination and managerial control. Berelson and Steiner (1964) and Schein (1988) defined the term 'work group' as a collection of individuals:

(a) Who have significant interdependent relations with each other?
(b) Who are psychologically aware of one another?
(c) Who perceive themselves to be a group by reliably distinguishing members from non-members?
(d) Whose group identity is recognized by non-members?
(e) Who have differentiated roles in the group as a function of expectations of themselves, other group members, and non-group members?
(f) Who, as group members acting alone or in concert, have significantly interdependent relations with other groups?

The definition implies that there is a high level of interaction among individuals within the organization. Interactions among the group members can take two forms: formal and informal. They are both interrelated, and play an important part in the organization. Formal groups are created as a process mechanism within the formal structure. Moreover, they are characterized by 'task-centered behaviour' where the tasks are divided and coordinated among group members with formal roles and duties. The other form: the informal groups are created as a result of personnel interaction and friendship among colleagues with no official constraints. Organizations and individuals at work can derive certain benefits from forming and becoming a member of a group. Handy (1998) provided the following purposes of the groups:

(a) Organizational purposes (the formal task functions). Organizations use groups, or teams and committees for the following reasons.
   (i) For the distribution of work.
   (ii) For the management and control of work.
   (iii) For problems solving and decision making.
   (iv) For information process.
   (v) For information and idea selection.
(vi) For testing and ratifying decisions.
(vii) For co-ordination and liaison.
(viii) For increased commitment and involvement.
(ix) For negotiation or conflict resolution.
(x) For inquest or inquiry into the past.

(b) Individuals’ purpose (the social function): individuals use groups for one or more of the following purposes.

(i) A means of satisfying of their social or affiliation needs.
(ii) A means of establishing a self-concept.
(iii) A means of gaining a help and support to carry out their particular objectives.
(iv) A means of sharing and helping in a common activity or purpose which may be making a product, or a carrying out a job, or having fun or giving help, or creating something.

There are several common bases for all the organization to group position into units and units into larger ones. These are as follows:

- Grouping by knowledge.
- Grouping by work process and function.
- Grouping by time.
- Grouping by output.
- Grouping by client.
- Grouping by place.
- Grouping by project.

### 6.15 Group Effectiveness and Success

The visible outcome of a cohesive group is its efficiency and productivity. The efficiency of the group and its productivity levels depends on many dependents and independent factors. Among these factors is group cohesiveness. There is increasing evidence that points to the power of group influences upon the functioning of organizations. In those situations where the management has recognized the power of group motivational forces and has used the kind of leadership required for developing and focusing these motivations on achieving the organization's objectives. Membership of groups which have common goals to which they are strongly committed, high peer group loyalty, favorable attitudes between superiors and subordinates, and a high level of skill in
interaction can clearly achieve far more than the same people acting as a mere assemblage (Likert, 1961).

In a building trades industry, works groups are continually being assembled, assigned to work for a while on a project, and are broken up when the project is complete. Upon completion, the individual workers need to be regrouped differently for a later project. Usually the foreman who selects men personally known to them, often on the basis of what they perceive to be the worker’s competence in his craft makes these groupings. A study was conducted by Raymond H. Van Zeist (1952, pp. 175-185) cited in Litterer (1967, p.87), where productivity of two types of construction groups was measured against time and cost of production. In this study, one project was selected where some construction crews were chosen in the usual fashion, while others were assembled on the basis of personnel choices made by the workers themselves. Each man was asked to indicate a person with whom he would most prefer to work, and work groups were formed to follow these choices as closely as possible. The result showed that those groups assembled on the basis of the personal choices of the members had significantly higher job satisfaction, lower turnover rates, lower indices of labour cost, and lower indices of materials cost. Litterer argued that, although in this research the results showed that effect of self-selection in promoting cohesiveness was high with apparently resultant high productivity, it would be erroneous to presume that cohesiveness built on such grounds would always yield high productivity.

In other researches carried out by Back (1952), where groups were formed on the basis of the personal attractiveness of the members, the group tended to stretch discussions out as long as possible in order to continue the pleasant conservations. As a result, they seriously reduced the speed with which they completed their assigned tasks. In yet another research into work groups by Fielder (1954), where productivity was high, the group members did not have any great personal attraction for one another.

These three works have provided an interesting paradox. In the first research, high personal attractiveness and high productivity go together. In the second, high personal attractiveness goes with low productivity, and in the third, a relatively low personal attractiveness accompanies high productivity. This paradox was explained by Litterer (1967) as follows:

First, all three research groups were highly cohesive but for the same reason. In both cases cohesiveness rested on personal attractiveness, in the other on team success and the purpose of the group. Second, productivity was measured by some system
external to the group. In some cases, productivity in-group teams was the same or congruent with those of the investigator, whereas in the second case they were to a considerable degree mutually exclusive. In the second case the group would have to turn its attention and conversation to solving technical problems, which would keep members from enjoying one another’s company, the basis of their cohesiveness. Hence, productivity based on the assigned task would have been unproductive from the standpoint of the group.

The principle of creating a cohesive group or units within the organization can also be applied to building a project team. As mentioned before, each project in itself can become an organization and therefore a building team is formed according to client and project characteristics. The building team usually comprises groups of people from the client organization, consultants, and specialized firms who are brought together to design and construct the building project. The fragmented nature of the construction industry, where design is separated from construction, places great dependence on the competence of the building team in setting up building process and bringing the work to a successful completion. Many earlier reports and research conducted in the 1960s and 1970s (Emmerson, 1974 and the Banwell, 1964 reports) stated that there is a lack of liaison between the architect and other professionals and contractors, and between them and clients. It has continuously been argued that in no other important industry is the responsibility for design so far removed from the responsibility for production. These reports emphasized the need to reform the organizational approach to building projects. Building projects management was seen to be a passive procedural activity, but the movement towards a more dynamic integrated approach was suggested by Higgins and Jessop (1965). They clearly identified that the problem of communication within the building teams was created to a large extent by the attitudes and perceptions about the values of contributors to the building industry. The most drawbacks to the traditional approach, as noted by Higgins and Jessop (1965), are the lack of effective communication and co-ordination between members of the building team. In other words, it is the nature of the relationships between the communicators, which creates the difficulties for communications structures. Five problems of communication were outlined, namely:

(a) Communication with perspective clients
(b) Communication between clients and advisers
(c) Communication within the design team
(d) Communication related to contract
(e) Communication within the construction team.

Higgins and Jessop (1965) then went further and noted that:

"If building is thought of without the people involved, it can be seen as a chain of interdependent operations called Technical System, i.e. briefing, design, estimating, billing, supplying, etc. To undertake these operations, a wide variety of resources, e.g. material and skill remain under the control of people and organizations which are called the resource controllers (i.e. The Social System)."

The central problem arises from the fact that the basic relationship which exists among 'resource controllers' has the character of interdependence of the resources and the organizational interdependence autonomy. There is a lack of match between the technical interdependence of the resources and the organizational independence of those who control them. Any attempt to re-order the division of responsibilities among resource controllers that might arise from purely technical study would run against deep-seated difficulties of conflicting values and vested professional, technical, and commercial interests. In subsequent research by the Tavistock Institute (1966), a thesis exploring the foregoing problem of communication among building teams was presented and provided a model of the structure and functions of the building industry. Two important characteristics that are incorporated into any model of the building process were identified-interdependence and uncertainty. The construction industry as a socio-technical system and its performance was seen as being dependent on the communication between and the interdependence of the participants. The building team was described as a sub-system within the overall system of environment. Thus, the socio-technical analysis and the three dimensions described by the Tavistock Institute (1965, 1966) of complexity, uncertainty and interdependency had a great impact on the introduction of alternative forms of team building in an attempt to achieve a wide co-ordination of control of the building process (such as package deals in the late 1960s and management contracting by the early 1970s).

The notion of integration of the building team has been reported in a number of studies, such as the Banwell (1964) report, Sidwell (1982), Naoum (1989), the Latham (1994) report and the Egan report (1998). Evidently, high integration among members of the building team can help to improve the performance of the project. It is also important, that each team and sub-team should be composed of people with various characteristics. The most important role in team building is the leader of the team.
6.16 Leadership as a Variable Affecting Performance

6.16.1 Introduction

The organization is founded to perform specific tasks through people. The person who leads the organization needs to have vision and be responsible to direct, control, motivate and co-ordinate between the people and the tasks of the organization. The leader needs to be decisive and a risks taker. The personal characteristics of the leader together with his/her style must be selected appropriately, depending upon the situation at hand.

Some researchers define leadership in terms of personality and physical traits, while other researchers believe that leadership is represented by a set of prescribed behaviour. In contrast, other researchers believe that the concept of leadership does not exist. Leadership is defined as “a social influence process in which the leader seeks the voluntary participation of subordination in an effort to reach organizational goals.” Leadership clearly entails more than wielding power and excising authority.
Fig. 28 A Conceptual Framework for Understanding Leadership, G. Yuki, (1989:274)

Fig. 28 provides a conceptual framework for understanding leadership. It indicates that certain leader characteristics/traits are the foundation of effective leadership. In turn, these characteristics affect an individual's ability to carry out various managerial behaviors/role. Effective leadership also depends on various situational variables. These variables are important components of the contingency leadership theories. Finally, leadership is result oriented. It is important to appreciate the difference between leadership and management to fully understand what leadership is all about. The two approaches, trait theories, which focused on identifying the personnel traits that differentiate leader from followers, and behavioral theories, examined leadership from different perspective. For the first approach Stopdill (1994) concluded that five traits tended to differentiate leaders from...
average followers: (1) Intelligence, (2) dominance, (3) self-confidence, (4) level of entry and activity, (5) task-relevant knowledge.

Traits play a control role in how we perceive leaders. If those traits are inappropriate (i.e. faster discriminatory selection and involved performance approach), they need to be corrected through training, and development may find it beneficial to consider selected leadership traits when choosing among candidates for leadership position (Horton, 1996), for the behavioral theory, has to focus on leader behaviour, instead of on personality traits. It was believed that leader behaviour directly affected work group effectiveness. The Ohio State researchers (1974) concluded that there were only two independent dimensions of leader behaviour: consideration and initiating structure. Consideration involves leader behaviour associated with creating mutual respect or trust, and focuses on a concern for group members' needs and desires. Initiating structure is a leader's behaviour that organizes and defines what group members should be doing to maximize output. These two dimensions of leader behaviour were oriented at right angles to yield four behavioral styles of leadership. It initially was hypothesized that the high-structure, high-consideration style would be the one best style of leadership.

Researchers thus concluded that there is not one best style of leadership. Rather it is argued that effectiveness of a given leadership style depends on structure factors (Bass, 1990). Another study (Bass et al 1990) done by the University of Michigan to identify behavioral difference between effective and ineffective leader. Researchers identify two different styles of leadership: one was employee centered, the other was job centered. These behavioral styles parallel the consideration and initiating-structure styles identified by Ohio State Group. In summarizing the results from these studies, one management expert concluded that effective leaders: (1) tend to have supportive or employee-centered relationships with employees, (2) use group rather than individual methods of supervision, and (3) set high performance goals (Varoom, 1976). The behavioral styles approach makes it clear that leaders are made, not born. This is the approach of the traits theorists’ traditional assumption. Given what we know about behaviour shaping and model-based training, leader behaviors can be systematically improved and developed. For example, a study demonstrated that employees' creativity was increased when leaders were trained to (1) help employees identify problems and (2) enhance employees' feelings of self-efficacy (Redmond, 1993). Bernard Bass (1990), a leader expert, concludes that:

"Leaders manage and managers lead but the two activities are not synonymous".

Managers typically perform functions associated with planning, investigating, organizing and control, whereas leaders deal with the interpersonal aspects of a
manager’s job. Leaders inspire others, provide emotional support, and try to get employees to rally around a common goal. Leaders also play a key role in creating a vision and strategic plan for an organization. Managers, in turn, are charged with implementing the vision and strategic plan.

OB researchers have discovered that leaders can make a difference. One study tracked the relationship between net profit and leadership in 167 companies from 13 industries. It also covered a time span of 20 years, higher net profit were earned by companies with effective leaders (Liberson et al. 1972). The destination of leadership and manager is more than a semantic issue for four reasons:

1. Leadership and managers perform a subset of unique functions. It is important to recruit and select people who have the required intellectual abilities, experience, and job-relevant knowledge to perform their job.

2. Difference may affect group-effectiveness. Staffing a production mix of leaders and managers can increase work performance.

3. Successful organizational change is highly dependent upon effective leadership throughout an organization.

4. Destination between leading and managers highlight the point that leadership is not restricted to people in particular positions or roles.

6.17 The Importance of Training Leadership in Construction Industry

Linda Clarke (1980) defined production as “the general category covering all labour processes and their social relations … concerned with manufacturing goods out of natural resources.” Labour process includes physical as well mental labour non-productive work and sectors of production and services and is always connected with the production process.

The contradiction inherent in any attempt to increase labour productivity in order to appropriate a higher rate of surplus value is evident in labour organization in all periods of history in terms of the vertical as well as the horizontal division of labour. The division of labour is commonly described as a division between brain and hand which, of course, can only be seen as a division between labour processes requiring more or less of either mental or manual skills, but which represents in the first place a relation of dominance. The horizontal division of labour into craft was in the terms of feudalism predominantly based on materials such as iron (smith), wood (carpenter) and stone (mason) over which the landlords had control.
To produce a building, firstly there is the basic condition of building production of the land with its varying productive. Secondly, there are the elements of building production of the raw materials, and thirdly, there are the tools required for labour to work on these objects. It outlines the basic process involved for labour in the building production process: the construction of infrastructure, the roads and drainage, the extraction of raw materials, and the assembly of the building themselves. The organization of labour was still maintained, and hierarchical division and set ratios between masters, journeymen and apprentices and entry to the trade was through apprenticeship. Once the old division of labour, based on the master system and split up according to different building materials, had been effectively broken, in part through the concentration of building development, material production and assembly in the hands of single capitalists, a new division of labour according to capital sectors could be established as civil engineering, the building materials industry and the building industry itself.

### 6.18 The Site Manager as a Leader

For any construction firm or company to be successful in the business, the degree of skills of site managers employed at site management level must be of the highest calibre. The site manager is most likely the most important player in the production of construction projects on site. Lack of basic leadership and managerial skills required by a site manager could cause heavy losses on a project. Likewise, a skilful site manager will be instrumental in the successful completion of the project in terms of quality, speed of delivery and, most of all, the profit for the project. It can therefore be said that the site manager can determine the success or failure of a contract.

According to one company executive of Thomas Telford Services UK, construction companies should take training of its staffs more seriously as the clients are requiring ever-higher quality services (Mike Walter, 1988). As a result of skill shortage and the competition of recruiting highly qualified site managers becoming intense, it follows that construction firms should encourage training their own staff to keep them ahead of the game (Waterhouse, 1995). The role of a site manager is to execute the project effectively and efficiently to meet the project objectives. The manager's job is therefore a demanding, complex, and varied one (Fryer, 1997).

According to Clough and Sears (1979), the task of site manager is an integrated process of co-coordinating and relating inputs of various parties involved on construction project to accomplish the project objectives. This is to say that the site manager will
require both ‘hard skills’ such as understanding and applying the technical know how and ‘soft skills’ i.e. personal and interpersonal relationships (Shiraz and Hampson, 1988). Shiraz and Hampson (1988) also suggested for site or project managers to meet the challenges in future. As a result of fast developments, advanced improved communication skills, trust and commitment, team building, leadership and goal achievement need to be developed. The key competencies for a successful site manager lie in the following:

a) Ability to communicate effectively and timely within the project and outside parties,
b) Ability to understand and articulate objectives and problems clearly,
c) Ability to work and make decisions effectively in changing situations,
d) Ability to understand and communicate the technical aspects of construction process such as engineering, financial accounting, etc.,
e) Ability to obtain commitment of sub-contractors to the objectives of the projects.

To maintain their competitive advantage or position, construction companies should therefore be knowledge-based organization with competence database comprising technical, professional, managerial, and personal skills (Putt, 1998). The advantage can only be achieved with companies that have invested in developing its human resources. First of all, the foreman is definitely part of management. The word “management” as used here has two meanings, and the foreman must keep both of them in mind in connection with preceding remarks. First, the foreman definitely shares responsibility for a company’s profit and loss and for the livelihood and well-being of hundreds of employees. Second, “management” means a way of getting things done, as stated in the following definition developed by the American Society of Mechanical Engineers (1986):

“Management is the art and science of preparing, organizing, and directing human effort applied to control the forces and utilize the materials of nature for the benefit of man.”

Thus, when a man, by becoming a foreman, has entered the ranks of management, his effort from then on will be directed not toward doing things himself, but toward getting others to do them, that is, toward “preparing, organizing, and directing human effort.”

Leadership is the ability to get other people to work willingly through the leader’s influence. Leadership has to do with the art of dealing with persons, of knowing how to reach the traits which move people to put forth their best effort. The major’s immediate duties and responsibilities which call for leadership will here be considered under the five broad headings:

1) Maintaining quality standards
2) Getting out the day’s work on time
3) Improving methods
4) Keeping down costs
5) Dealing with personnel problems.

6.19 Project Success/Failure and its Relevance to Project Leadership

Before embarking into details, it is necessary to define the meaning of a project. The Association of Project Managers (1994 p.13-39) defines it as:

"human activity that achieves clear objectives against a timescale"

Success or failure of the project refers to the project management criteria (budget, schedule, and technical specification). Projects have become more and more complex over the years. Now there is a great deal of fragmentation in the construction project structure and, therefore, the presence of a strong leadership has become a crucial element in integrating this fragmented structure to achieve a common goal and that is the project success.

As Karbanda et al. (1996 p.334-335) stated:

".. the one person who can indeed make or break a project is the project manager/leader... " And they comment on the project manager's duty in working to prevent failure "...This is largely a question of leadership, those qualities of a project manager are all important".

They also outlined a "Guide to ensure project failure." One of the aspects they mentioned in their guide is "Make sure the project is run by a weak leader." Under this heading they argued that:

"Obviously the term weak leader is oxymoronic: successful leaders exhibit many traits, but fundamental weakness is not one of them. Leadership is an essential ingredient for project success. To borrow a concept from physical science, projects, if they left to their own devices, tend to run towards entropy".

In regards to this point they pointed out that the natural project state is often chaotic and disordered than logical and pragmatic. In the absence of strong leader to keep the project team operating on track, most projects begin to experience the vacuum of indecision-orders are given and rescinded, and a general sense of aimlessness surrounds them. Weak leaders are not merely unhelpful to a project's successful completion, they are actively counterproductive. Karbanda et al. (1994) pointed out that in the entopic state into which a project can easily fall, money and time are wasted and productivity is minimized, all because there is no firm hand on the tiller.
Furthermore they added:

"that the project leader is the one person who has the power to make the project succeed by marshalling resources, motivating team personal, negotiating with stakeholders, cheerleading the development process, and constantly keeping an eye on the ultimate prize, the successful project."

They then noted that:

".. Project managers’ role in the successful project development is highly visible. Conversely, in the preponderance of projects that failed, the project manager either was essentially invisible to team members or exhibited the worst sorts of characteristics a project manager can have, weakness, and laxity in place of decisiveness for clients."

Sir John Egan (1998 p.11, 35, 39) in his report, pointed out that there is a great deal of client public and private dissatisfaction in the construction industry due to the under-achievement by the industry. He stated that:

"projects are widely seen as unpredictable in terms of delivery on time within and to the standards of quality expected. In short construction too often to meet the needs of modern businesses that must be competitive in international markets, and rarely provides best value for clients."

Egan (1998) looked at what has driven the manufacturing and services industry to achieve the success and changes in the UK. He then identified a series of fundamentals to the process which he believes are applicable to the construction industry as to any other business concern. The first he identified was committed leadership.

"this about management, believing in and being totally committed to driving forwards an agenda for improvement and communicating the required cultural and operational changes throughout the whole of the organization."

Egan also identified the need to integrate the process and the team around the product as one of the fundamentals to the process. This point is part of what a strong committed leadership should provide. He then outlines other fundamentals and argued that if those factors were applied there could be:

"dramatic improvements in the efficiency and quality of construction."

The need for integration and therefore the presence of project management to improve the project process and hence increase success is identified by Sir Egan:

"If we are to extend throughout the construction industry the improvements in performance that are already being achieved by best, we must begin by defining the integrated project process. It is a process that utilizes the full construction team, brings the skills of all the participants to bear on delivering values to the client. It is a process that is explicit and transparent, and therefore easily understood by the participants and their clients..."
The rationale behind the development of an integrated process is that efficiency of project delivery is presently constrained by the largely separated process through which they are generally planned, designed, and constructed. These processes reflect the fragmented structure of the industry, and sustain a contractual and confronted culture. Egan again referred to integration and leadership of the process when he spoke about project implementation, where he defined it as “translating the generic product into a specific project on a specific site for a specific customer.” One of the key factors he stated to be required for efficient project implementation and hence efficient project implementation, and hence efficiency in cost and such was leadership.

"leadership of an integrated team of suppliers, constructors, and designers dedicated to engineering and constructing the project."

Egan also stated that:

"Substantial changes in the culture and structure of UK constructions are required to enable the improvements in the project process that will deliver our ambitions of modern construction industry."

He outlined things such as working conditions, health and safety, and then posed the question of whether the construction industry has the right skill to improve productivity. He stated:

"there are significant gaps at the various skills."

He mentioned these gaps as follows:

"At the project level, we see a need for training in integrating projects and leading performance improvement from conception to final delivery."

Egan then comments that:

"Quality will not improve and costs will not reduce until the industry educates itself not only in the skill required but in the culture of the teamwork."

Latham (1994 p. 42-43) wrote about the necessity for a project leader especially with the increase in complexity of the firm. He pointed out that the project manager is responsible for dealing with the contractor and other consultants. However, he argued that:

"There is a mixed view within the industry about the effectiveness of project managers."

He then explained that:

"If there was lack of effectiveness it could be due to the project managers’ individual performance (possible weak leadership) or that the project manager has been appointed at a late stage of the process..."

He pointed out that effective management of the design process is crucial for the success of the project and then pointed out that the presence of a lead/project manager in addition to other factors are:

"Crucial to the success of the project."
He then stated the necessity for:

“Integration of design and specialist team.”

Morris and Hough (1987 p.126) listed the important factors that cause project success or failure and in their list. These included:

"Effective leadership, teamwork, resources, and communications."

These factors are all included as part of the duties of the project manager in the CIOB Code of Practice for Project Management (1996). Trevor Young (1996 p. 25, 27, 34-40) argued that it is the responsibility of the project manager to achieve a successful outcome. He then pointed out that:

"To achieve success in your project you need to use a collection of skills that demonstrates your ability to lead a team."

The importance of a strong leadership in relation to the success of the project was also point out by Dennis Lock (1996 p. 42) where he said that:

"A badly informed group with vague responsibilities and ambiguous levels of status and authority, is likely to be poorly motivated, slow to achieve results, costly to run and extremely frustrating to work with."

Although the word 'leadership' was not included, lack of clarity of purpose and responsibilities all boil down to the quality of leadership of the project. Dennis Lock (1996) also noted that:

"If the objective of projects management is to ensure project completion within time and cost then these goals could be achieved by a variety of ways."

He then said that the project manager could achieve 'success' by including fear and trepidation. This approach, as Alan Bryman (1992 p. 12-15) argues, is dictatorship and not leadership. The other approach he states:

"Through gentle but firm persuasion, his ability to motivate",

He then states that:

"Average participant will appreciate being led by a project manager who commands respect by his qualities of leadership"

Going back to the relationship between the project outcome and leadership, Albert Hamilton (1997 p. 31, 191-221) remarked that:

"The successful management of projects is linked directly to the individual called project manager and the responsibility and authority assigned to that position. There is a direct correlation between accountability for the project being in the hands of the project manager and the successful outcomes of the project."

He also observed that:
"Knowledge of procedures and techniques are not the answer to running a successful project. The astute project manager and the ability to lead, motivate and integrate the project team are equally important."

He then modified about those personal skills required by a project manager and included leadership qualities. He commented that weak leadership would create problems such as unclear goals/direction and interpersonal conflicts.

In regard to the dangers of having unclear goals the quotation by Ralph Kliem and et al. (1994 p. 73) explains that:

"A project without goals and objectives is like a person without eyes or ears."

Also Geoff Reiss (1994 p. 13, 39) When he outlines:

"Nine steps to project success",

The first he includes was the definition of the project.

In a survey conducted by Walid Belassi (1996 pp. 141-151), he identified that the critical factor for project success or failure in the construction industry was the project manager. Finally, for any construction firm or company to be successful in the business, the degree of skills of site manager employed at site management level must be of the highest calibre.

The site manager is most likely the most important player in the production of construction projects on site. Lack of basic leadership and managerial skills required by a site manager could cause heavy losses on a project. Likewise, a skillful site manager will be instrumental in the successful completion of the project in terms of quality, speed of delivery and, most of all, the profit for the project. It can therefore be said that the site manager can determine the success or failure of a contract.

6.20 Conclusion

This chapter has dealt with the organization of environmental forces subsystem (task and external environment) and the organization of structural subsystem. The nature of the environment, being stable, sophisticated, diversified or hostile, will determine what course of action (i.e. strategy) the organization should take in order to survive or take advantages of opportunities. There are four major environmental forces that require close attention; these are political, economical, social and technical. All of these variables will affect each other, and will affect the variables of managerial, technical, goals and values, structural and psychosocial sub-systems. The organization is highly affected by the external environment and four factors are at play:

- Inputs- the resources required to initiate the project or to operate the organization,
Process- the activities involved in transforming or converting the inputs into outputs,
Outputs- the completed products such as building and/or successful organization,
Feedback- the measures for achieving the aims and objectives of the project/ or organization.

This chapter also has emphasized the importance of organizational structure. The types of structures and the factors that influence selection of the appropriate structure for the construction industry have been discussed. Structure follows strategy, and is defined as a mechanism for linking and co-coordinating people and groups together within the framework of their roles, authority, and power. Structure can be regarded as the backbone of the organization. The chapter provides evidence that structure influence effectiveness, in particular, the attitude and behaviour of the people working within the structure. This in turn influences productivity and efficiency.

Within a large construction organization the key to the success of this devolution of responsibilities is a partnership between HRM and line managers that remains flexible in order to allow it to cope with the inherent changes that beset all projects. The role of the human resource manager is broader and more complex than that of the personal manager. Notably, the function of human resource management is considered a core managerial function rather than a specialist support function, and is considered good practice for anyone with managerial responsibility to be involved with employee-management issues (Cornelius, 2001).

This transition from specialist support function to mainstream management activity can be seen to have occurred in many modern organizations and has paralleled the wider acceptance of HRM as a way of securing competitive advantage.

6.21 The Main Variables of Organization of Environmental and Structural Subsystem as Conclusion

The study has been given an increasing interest in examining the links between Managerial Activities (variable 1.1) and System Performance (variable 9.1), considering the link in a construction context and has argue that there is an absolute necessity to place HRM (Human Resource Management) issues at the center of decision-making.

The function of Human Resource Management (HRM) as dependent variable (variable 3.1) is considered a core Managerial Activities as a independent variable (variable 1.1), rather than a specialist support function, and is considered good practice for
anyone with managerial responsibility to be involved with employee management issues (Cornelius, 2001).

The *Organization of Environmental Subsystem* (variable 2.3) and the Organization of Structural Subsystem (variable 2.4) as primary variable will cause an effect on *Human Resource Management* (HRM) as dependent variable (variable 2.1). The *Organization of Environmental Subsystem* (variable 2.3) as primary variable will affect the organization at three zones as Kast and Rosenzweig, (1981) identified: ‘the external environment (macro level-zone 1), the organization environment (micro level-zone 2), including strategic and coordinative level, and the project environment (site/operation level-zone 3).’ The *Organization of Structural Subsystem* (variable 2.4) as primary variable will affect the performance of the project, as Naoum (2001, p.76) argued that: “A mechanism for linking and coordinating people and group together within the framework of their roles authority, and power. Structure can be regarded as the backbone of the organization and its effectiveness”.

The study, also, reviewed the various variables that affected the performance of the project:-

a) **Nature and content of job**: Armstrong (1991) identifies four factors which are important to effective job design: the process of intrinsic motivation; the characteristics of task structure; motivating characteristics of jobs; and the implications of group activity. Also, Torrington and Hall (1995) identified that: ‘Job design can also be as important tool in engendering organizational change.’

b) **Integration and co-ordination between building team**: In these terms, it is evident that, while the construction industry has differentiated in response to increase complexity (as seen in the growth of subcontracting and, more recently, professional diversity), it has struggled to provide necessary levels of integration to counter its adverse effects (NEDO, 1988; Latham, 1994; Egan, 1988).

c) **Employee resourcing**: The major components of employee resourcing are recruitment and selection, deployment and team formation, performance management, retention and training, career development, dismissal and redundancy (Taylor, 1998). Also, Beardwell and Holden, (1997) stated that: ‘Employee resourcing activities aim to ensure that the right skills and competencies are in the right place at the right time. This inevitably results in a balancing act in which managers have to consider longer-term strategic considerations while providing immediate solutions for the short-term operational issues.’

So, the *Organization of Environmental Subsystem* (variable 2.3) and *the Organization of Structural Subsystem* (variable 2.4) as primary variable will cause an effect on *Human Resource Management* (HRM) variable (3.1). Also, they cause an affect on *Human Resource Planning* (variable 4.1), *Job design & Characteristic* (variable 4.4), *Working Condition* (variable 4.5) *Working Environment* (variable 4.7) and *Human Resource Information* (variable 4.9).

*Human Resource Planning* (variable 4.1) is the main function of the *Human Resource Management* (variable 3.1). *Recruitment* (variable 5.1), *Selection* (variable 5.2),
and Training and Development (variable 5.3) are the main basic functions and components of Human Resource Planning (HRP) (variable 4.1).

The object of Training and Development (variable 5.3) is to alter the behaviour of employees in a way that will create improvements in the achievement of organizational goals. It provides opportunities for an employee to learn opportunities for an employee to learn job-related Skills (variable 6.1), help people to acquire Knowledge (variable 6.2), changes in individual Ability (variable 6.3) and changes Attitudes (variable 6.4). Encouraging employees to work in a way which leads to better-quality products and therefore a more positive organizational images demands that they are trained and developed in a way which strives to achieve quality improvements.

In accordance changes in these four variables, Skill (variable 6.1), Knowledge (variable 6.2), individual Ability (variable 6.3) and Attitudes (variable 6.4) will cause changes in the following end result intervening variables:

a) Highly motivated and satisfied worker, variable 7.1, as Pigoes and Mayers, 1969 (ed. Shaddad 1983) argued that: ‘...when employees are so well trained that they experience direct satisfactions associated with a sense of achievement and the knowledge that will develop their inherent capabilities at work’

b) Competence worker, variable 7.2, as ILO's report 1998 stated that: "...retains a job, improves their productivity at work, and their income earning..."

c) Healthy and safety worker, variable 7.3, as Levitt et al. 1976 (ed. Shaddad, 1983) argued that: "...reduces accidents, increase output,"

d) Low absenteeism and turnover, variable 7.4, as Pigoes et al. 1969, (ed. Shaddad, 1983) argued that: "...Dissatisfaction, complaints, absenteeism and turnover can be reduced...

e) Continuity of production, variable 7.5, as King et al. 1964, (ed. Shaddad, 1983) argued that: "...reduces learning (cycle) time; this is almost the traditional result of improved training methods,"

f) Cost control and project effectiveness, variable 7.6, as Glueck 1974, (ed. Shaddad, 1983) "Training can reduce waste, and increases output..."

g) High quality of production, variable 7.7, as De Simon, 1966, (ed. Shaddad, 1983) argued that: “Better quality is often quoted as a benefit of improved training method...” and

i) Machine utilization, variable 7.8 as Shaddad (1983) argued that: “improving the ability of an operator can affect machine utilization”

Consequently these changes will affect the end result Efficiency variable 8.1, Effectiveness variable 8.2, and Competence variable 8.3, and the end result variable...
which is *System Performance*, variable 9.1, as Martin *et al.* (2003) stated that: "... where those industries which invest in training tend to perform better and have a more positive public image than those which do not."

The general and task *Environmental Subsystem* (variable 2.3), will influence every variable in the system.
Chapter 7: The Other Variables that Affecting the Performance of the Organization

7.1 Introduction

7.2 The Organization of Information and Training

7.2.1 Introduction

7.2.2 Theoretical Aspect of Management System and Training

7.2.3 Human Resource Information System (HRIS)

7.3 The Resource Composition Subsystem as Important Variable to Training and Development of Workers

7.3.1 Introduction

7.3.2 Theoretical Aspects of Composition Subsystem

7.4 Capital Subsystem as a Variable Affecting Performance

7.4.1 Introduction

7.4.2 Theoretical Aspects of Capital Subsystem

7.4.3 Application of Capital Improvement in Construction Industry

7.4.4 Working Environment as a Affecting Performance

7.4.4.1 Introduction

7.4.5 Application of Safety Working Environment in Construction Industry

7.4.6 The Quality of Work Life as a Variable Affecting Performance

7.4.6.1 Introduction

7.4.7 The Importance of Working Environment to the Performance of Workers in the Construction Industry

7.4.8 Safety Behavior: its Influence on Attitudes Of Worker in the Construction Industry

7.4.9 Implication for Construction Industry

7.4.10 Promoting the Health of Construction Workers

7.5 Conclusion

7.6 The Main Variables of the Organizations of Project Information, Capital and Resources Composition Subsystem as Conclusion
THE OTHER VARIABLES THAT AFFECT THE PERFORMANCE OF THE PROJECT

7.1 Introduction

The fourth, fifth and sixth project Managerial Subsystems, as illustrated in Fig. 8, focuses on the Organization of Project Information Subsystem, the Organization of Capital Subsystem and the Organization of Resources Composition Subsystem. This chapter explores the potential impact of the above subsystems on the Human Resource Management (HRM) and hence their affect on performance of the project. For the purpose of the study, it is not attempted to address all aspects of the above subsystems. It does not neglect these important issues, but restrict it in one chapter. The level of performance attained by the construction firm is determined by a variety of organizational, technical and human factors, many of them are directly controlled or influenced by management decisions. Also, researchers regarded the management information system (MIS) as the linking mechanism of many factors such as: decision making, site supervision, communication and morale. Several other researchers have emphasized the importance of utilizing effective resources in order to improve project performance. Stukhard (1987) suggested that the ability to achieve hinges, primarily, on the attainment of forecasted productivity and manpower levels. Equally essentials to project success are the minimization of construction interferences, effective field co-ordination and proper co-ordination and proper control of activities.

7.2 The Organization of Information Subsystem and Training

7.2.1 Introduction

A system of information flow is vital to the decision-making process. Information is the raw material of intelligence that touches off the recognition that a decision is to be made. Information is essential in evaluating alternative courses of action. A decision maker can be viewed as an informational processing system. Information can be conveyed in many ways, both formally and informally. Periodic reports with a standard format provide formal feedback on the operating system, information being the substance of communication systems. In its various forms-electronic impulses, written or spoken words,
Informal or formal reports—information is a basic ingredient for decision-making. Peter Drucker (1980) remarked that:

"The manager has a specific tool: information. He does not handle people; he motivates, guides, and organizes people to do their work. His tool, his only tool, to all this is the spoken or written words or the language of numbers."

As organizations have been faced with dynamic world conditions, rapidly changing technology, changing markets, and other similar phenomena have required adoption on their part. Adjustments have been made, but without recognition, in many cases, of the impact of organizational changes on communication systems. Thus, much information that was appropriate under older arrangements has now become obsolete. Furthermore, additional types of information are urgently needed in order to plan and control current operations. Daniel (1961 pp.112-113) observed that:

"Management often loses sight of the seemingly obvious and simple relationship between organization structure and information needs. Companies very seldom follow up on reorganizations with penetrating reappraisals of their information systems, and managers given new responsibilities and decision-making authority often do not receive all the information they require."

At the age of increasingly sophisticated computerization, it may be possible to include all the data from all subsystems in a management-decision system. But, even if it was possible, it is not clear that it would be an efficient use of resources. The system should be evaluated on the basis of cost/benefit analysis. A balance should maintain between the cost of the system and the value of the information generated. Much attention has been focused on computerized management information system (MIS). Kelly, J.F (1970, p.5) defined it as:

"the combination of human and computer-based resources that results in the collection, storage, retrieval, communication, and use of data for the purpose of efficient management of operations and for business planning."

It is acknowledged that the effective provision and use of HR information can create a competitive advantage for the organization, resulting in a lower turnover, increased job satisfaction, high motivation and less internal conflict (Cox & Blake, 1991). To this end, the development of the first HRISs (Human Resource Information Systems), focused on skill, and payroll functions (Walker, 1993), were begun in the USA in the 1950s, aimed at providing more effective access to information relating to works and workers. The early HRISs maintained descriptive personnel data about employees, organizational data, wage, and salary data, and work history data mainly for administrative and operational use (Nankervis et al. 1996). As computers became more powerful in the late 1950s, payroll
and personnel systems advanced accordingly. By the 1970s and 1980s, the increasing complexity of payroll systems also demanded more flexibility in, and access to, information systems, and this consequently led to further sophistication in HRISs.

### 7.2.2 Theoretical Aspect of Management Information System and Training

The construction as mentioned before is characterized by its fragmented nature of operation and susceptibility to economic fluctuations. While many construction firms have become increasingly decentralized and disintegrated, the workforce has become more and more diverse (Barton, 1985). Although subcontracting has proven for some to be a successful alternative, the management of Human Resources (HR) is still a very important aspect of the overall planning and management activities of construction business (Patchett, 1983). For many construction companies, though, HRs is highly mobile, and recruited on a casual or project-by-project basis (Langford et al., 1983). As a result, HR information is widely spread between interdependent departments and business units in construction firms thereby making its extraction and use increasingly difficult. In addition, the casual nature of employment in the construction industry makes planning of human assets requirements a vague exercise that can result in low productivity, high labour turnover rates and reduced motivation to train and plan for the future.

Researchers regarded the Management Information System (MIS) as the linking mechanism of many factors such as: the decision-making, site supervision, communication, and morale. Reinschmidt (1976) argued that the productivity of firms depends on the management's access to accurate information to aid in faster decision-making. Information, which does not flow promptly from one group to another, will cause delays, rework, and low motivation and, hence, decrease productivity. Human Resource Information Systems (HRISs) offer a means of coping with these problems through improvements to reliability, accuracy and accessibility of the HR information. A HRIS is a computerized system used for acquiring, storing, manipulating, analyzing, retrieving, and distributing pertinent information regarding an organization's HR (Arthur, 1987). The fundamental aim of a HRIS is to facilitate or support strategic, tactical, and operational decision-making, to evaluate programmes, policies, practices, to support daily operations, to provide information and a host of other supports in the management, development, and utilization of the HR of an organization (Kavanagh et al., 1990). Also, recasting the role and breadth of HRISs not only enhances the performance of the HR function, it also has the potential to transform the HR department into a repository of new organizational wealth.
(Townsend & Hendrickson, 1996). In addition HRISs have a potential role in decision-support and strategic manoeuvering, with large or small, companies looking for HRIS to, among other things, help make informed decisions, get the most out of people assets, streamline HR processes and better allocated HR (Miller, 1998). Many research studies in HRISs have been carried out. For instance, Satao (1996) developed for educational institutions which combined the functions of payroll and personnel departments. Martinsons (1994) benchmarked the HRIS in Canada and Hong Kong and developed a knowledge-based system for manpower planning, recruiting, management development and performance appraisal (Byun & Suh, 1994; Martinsons, 1997). A Human Resource Information System (HRIS) has also been developed and used by the US Navy shipyard with more than 80,000 employees (Niehaus, 1995).

Despite that, little research has been undertaken concerning their development in the construction industry context. A survey revealed that only one-third of the construction companies in the US had personnel departments and a written human resources philosophy statement (Albanese & Ferris, 1991). Maloney (1997) has asserted that construction firms failed to develop international HRIS strategies to suit the changing external environments. Hillebrandt & Cannon (1990) argued that personnel issues are a secondary-order function in construction. The construction industry has retained a short-term approach to the management of labour, even including professional and managerial employees (Drucker et al. 1996). Perhaps the most relevant study on construction of HRIS is a decision support system developed by Serpell & Maturana (1995), which mainly focuses on information concerning performance and labour satisfaction.

7.2.3 Human Resource Information System (HRIS)

According to Patchett (1983), the major activities involving HR information in construction are:

a) Manpower development and planning: the aims of manpower are to maintain satisfactory HR levels both in quality and quantity, to maximize the performance and well being of existing HR, and to anticipate potential HR surpluses/deficits and identify associated problems. The process of manpower development and planning has been widely discussed (e.g. Pettman & Tavernier, 1984; Storey & Sisson, 1993). The key stages comprises the following: (1) assessment of existing manpower, (2) assessment of external factors, (3) establishment of training and staff development policy, (4) forecasting labour demand, and (5) forecasting labour supply.
b) Payroll functions: the payroll system basically includes information relating to the employee remuneration position, and involves details of payments, deduction of claims per employee, leave type and leave accruals (Walker, 1993). Pay system capabilities include the provision of a variety of printed documents (e.g. pay office reports, cheque printing, etc.) and support for many necessary administrative analyses. Companies in general are moving towards the integration of payroll systems with the HR departments, driven by government regulations and the increasing complexity of benefits (Nankervis et al. 1996).

c) Labour control: labour control enables management to optimize labour output per hour (Moore, 1988). Factors likely to affect this include the impact of work changes on labour, poor weather, labour turnover, accidents, and unsafe conditions. Relevant information is essentially concerned with labour records. Labour records which provide crucial accounting information for payroll, such as time and attendance allowances, overtime and overtime allowances, labour costing and rosters (Mincks & Johnston, 1998). The labour records also enable workers' productivity, in terms of output per unit of labour, to be calculated.

d) Safety management: construction firms with a poor safety record eventually become less competitive because of increased insurance premiums, lower employee morale, increased costs of fines and overall loss of profit (Mincks & Johnston, 1998). Adequate records and dissemination of information to employees regarding the company's safety policy, accidents prevention, substance abuse, personal protection equipment, hazardous materials, safety accident reporting, and investigation, etc are the key information requirements.

e) Industrial relations: a poorly managed workforce can have adverse effects on organization operations. These include efficiency, low productivity, low morale and absenteeism through covert conflict in the workplace, or over conflict resulting in loss of working time through strikes, bans, go slows, etc. (Nankervis et al. 1996). The management of industrial relations generally requires information concerning wages, working hours, working conditions, overtime premiums, holidays, allowances, safety representatives, dispute procedures, and equal employment opportunities (Barrie and Paulson, 1992).

f) Compensation and benefits: it is necessary for HR managers to decide what benefits to offer, and how best to pay the workforce (Boudreau & Milkovich 1998). D'Netto (1997) suggests that performance appraisal could measure and evaluate how well employees are doing their job, correct their mistakes and acquire new skills. HR information for estimating
and budgeting includes performance appraisal, external and internal staffing, training and development, compensating and benefits, and employee relations.

7.3 The Resources Composition Subsystem as a Important Variable to Training and Development of Workers

7.3.1 Introduction

The main resources of a construction project are: human resources, materials and equipment resources, technical knowledge, information and time. Turin (1969) argued that human resources, materials, plants, and tools are the major factors of production. A manager is a person in an organization who is responsible for the work performance of one or more other persons. People as mentioned are a basic resource of organizations. As human resources, they use material resource such as information, technology, raw materials, facilities and money to produce goods and services. Successful project managers can be described as bringing together all the correct composition of resources, at the right place, at the right time in the right quantities and methods and in the most economical manner to meet the objectives, and maximize of system performance of the project. The most important input of construction is made of building materials and components. The building materials industries exist only to serve the construction industry. The composition of demand for materials is affected by the composition of construction output and by the construction technology used.

7.3.2 Theoretical Aspect of Resource Composition

Technology refers to the application of knowledge for the more effective performance of certain tasks or activities. Technology converts spontaneous and reflected behavior into behaviour that is deliberate and rationalized. Ellul J. (1964) gives a broad connotation to technology or, as he calls it, techniques: "in our technological society, technique is the totality of methods rationally arrived at and having absolute efficiency (for a given stage of development) in every field of human activity." Construction industry, has been recently characterized by introduction of innovations, some methodological, some technological. It is important to be clear as to what we mean by industrialization of production in construction industry. McGhie (1983) defined it as a means of mass production by machine processes, which imply:

1. Standardization of the product,
2. Mechanization or automation of production,
3. Specialization (sub-division) of labour;
4. Concentration of production, purchasing and marketing.

It is important to raise this now to avoid any confusion that might arise with the concepts of the so called 'industrialized building' which is really a very distant or peculiar kind of characteristics, namely, prefabrication and systematization. Prefabrication is the making of building elements away from their final position for assembly at the point of erection. Systematization is the design process which gives rise to an assemblage of standardized and correlated elements in which ad hoc construction methods are rationalized. Technical change in components, their number, variety, material, inter-relationships and uses shapes and influences design and production of buildings in conformity with the development of the productive forces in general. The industrialization of production leads to the industrialization of building. McGhie identified the main characteristics of this evaluation as follows:

1. Quantities increase of production of materials and components.
2. Widening of the range of materials available.
3. The invention of new materials, components, installations and processes corresponding to the development of science and technology and in response to the widening and dipping of social needs and uses as reflected in the diversification of building types and of users specifications.
4. A general shift in the division of labour away from 'traditional' building trades on site to industrialized production processes and machinofacture in factories.
5. A sharp division of labour between design and construction, and the increased importance of design in the overall building process.
6. A widening of the design element in building and a division of design labour into discrete 'designs' professions.
7. A 'technicisation' of design and changes in design 'philosophy' corresponding to the changes in the forces of production.
8. Increased mechanization of non-site production and of design operations.
9. Decline of 'traditional' skills and the emergence of new and transformed skills.
10. Increased use of systematic management techniques in construction operations and in design offices.
11. Relative de-skilling of site operations, with variations over different branches of production. Many new skills have come into being and taken the place of extinct or declining skills.
There are many factors providing general rules for determining industrialization; they are likely to improve system performance. Bishop (1974) suggested the following:

1) Relative cost of materials (including waste) should be checked first. This is often the easiest comparison and is the one that may be decisive;
2) All items of labour cost must be checked when compared, and is on-site and off-site labour cost;
3) Relative cost of production must be considered; processes which can be operated on site are nearly always cheaper when used on site;
4) Whether the production methods combine several elements into one;
5) Production of specials which can add greatly to the cost of prefabricated solutions;
6) Relative cost of transport, particularly if the units are heavy and/or are fragile;
7) The kind of substitution, which it makes. Industrialization has far made little progress in the road of substitution of highly skilled labour. Until it can do so, its contribution to the productivity problem is doubtful;
8) The degree of acceptance of standardization of components. From the management point of view complete industrialization is totally different from traditional methods. However, the development of industrialized construction has had its effect on system performance of the traditional construction project in providing challenges, in stimulating new ideas and in developing ideas, which are absorbed into traditional construction.

Although the above mentioned variables, i.e. industrialization, mechanization, technical innovation, economy of scale, designing and specialization subcontracting, are all important variables they improve the organization of resources composition and hence system performance.

7.4 Capital Subsystem as a Variable Affecting Performance

7.4.1 Introduction

The sixth managerial subsystem as illustrated in Fig. 6 is the organization of capital subsystem. The utilization of capital resources is very essential to maximize the system performance of the construction of a project especially in the time of high cost of competition in construction industry and the short economic life of its capital. Shaddad (1983) identified six factors, regarding an organization of capital resources as consisting not only of an arrangement of physical facilities, plants, tools, etc. but of:

1) Preplanning, planning, and scheduling to facilitate field of execution of a task;
2) Decision relating to site layout;
3) The development and implementation of optimum construction methods for doing work;
4) Controlling and monitoring the realization of the production aim with the aid of the chosen production system;
5) Project resources logistics and organizational support;
6) Capabilities and limitations of man as part of the man-machine-method-environment system.

7.4.2 Theoretical Aspect of the Organization of Capital Subsystem

The concern with the organization of capital resources dates back to the early days of the construction industry. Of all the industries, construction industry was the pioneer at the start of formal studies of the organization of capital resources. The traditional universal management approach began with the work of Henri Foyal (1916) on improving efficiency in French industry. The second major pillar of classical theory was the development of the quantitative management approach. At the same time that Foyal identified the traditional universal approach for management, Frederick Taylor, Frank Gilbreth, and Henry Gantt were tackling the problem of efficiency in a scientific way. In 1916, Taylor developed two principles of management: The first principle was that there is a 'one best way' of performing a task. Taylor argued that, by applying scientific methods of analysis, it is possible to break down the work into tasks and subtasks, and then re-arrange them into the most efficient method of working. Taylor's second principle was that, by separating the actual exaction of the work from its management, there would be a more efficient method and procedure for coordinating and controlling of work. These two principles were then set forth into new duties of management:

1- The development of a true science for each person's work and not the old rule-of-thumb
2- The scientific selection, training and development of workers, unlike in the past when they chose their own work and trained them as best they could
3- co-operation with the workers to ensure that work is carried out in the prescribed way
4- The division of work and responsibility between management and the workers.

Around 1915, Gilbreth took Taylor's work further, and developed a technique on work measurement, named 'work study'. It all began while he was an apprentice bricklayer and noticed that the bricklayers who taught him worked in three distinct ways- one when they were demonstrating the job to him, one working normally and yet another when
working on bonus. The end result was the same in each case: bricks were laid, but this illustrated a maxim that every manager should remember— it is the way in which it is done that is important. This is the concept of work-study which eliminates the ineffective movements and inefficient tools from the operation in order to increase efficiency and productivity without changing the workload of the operator. The work of Gilbreth and Taylor was carried on forward throughout the 20th century and, in about 1960, the quantitative management approach autonomy from the traditional universal approach established its formal root. During the 1960s the quantitative approach was characterized by the techniques of operational research. At that time, various mathematical models were developed to solve decisional problems such as CPM (Critical Path Method), PERT (project Evaluation and Review Technique) and liner programming. By the 1960s, the quantitative approach turned away from emphasis on narrow operational research techniques towards a broader perspective of ‘management science’. The management science approach incorporates quantitative decision techniques and computerized information systems and operations management.

7.4.3 Application of Capital Improvement in Construction Industry

The Building Research Station in the U.K. (1948) showed that there was difficulty in applying work-study techniques in a general way to the construction industry. Brech (1971), however, argued that it was proven by practical application that the technique of work-study has a very considerable contribution to make to the construction industry. Whitehead (1976) recapitulated, summarized, and commented on the varying views advanced by some practitioners and academicians in the construction industry in U.K. regarding the use of work-study. He grouped the individuals with reference to work-study into three categories, which are:
1) Those that were either dissatisfied with, or not convinced of the possibility of applying work-study to the present situations;
2) Those who have tried, to some extent, to use work-study;
3) Those, generally large companies, who were thoroughly committed to the use of work-study.

The successful realization of a project will depend upon careful and continuous planning. The purposes of planning are to persuade people to perform tasks before they delay the operations of other groups of people, and in such a sequence that the best use is made of available resources; and to provide a framework for decision making in the
event of change. Assumptions are invariably made as plan is developed: these should be clearly stated so that everyone using the plan is aware of the limitations on its validity. Programmes are essentially two-dimensional graphs, and in many cases are used as the initial, and sometimes the only, planning technique.

A number of surveys conducted by Wade (1968), McDonald (1970), Fondahl (1964), Howe (1975) and Davis (1974) attempted to find the facts with regards to network analysis techniques application in the construction industry. Davis (1974), who surveyed the 400 largest construction companies in the U.S.A, stressed that 80%, of the 235 companies, which responded, used network methods and only 7% used it on even small projects. However, a small percentage of the companies using network analysis felt that they are very successful in achieving the numerous benefits attributed to the use of the procedure.

Operational research deals with the attempts of management to avoid costly errors. Many standards techniques have been developed to model operational research problems and to assist in obtaining solutions. Some of these techniques are:

1. Allocation of resources to jobs to be carried out;
2. Replacement of plant and equipment;
3. Queuing and the selection of the next for service;
4. Inventory or stock control for holding and storing valuable resources.

In any consideration of work-study, it cannot be stressed too early or too heavily that its success depends upon securing the vital co-operation from the human subject of work-study. Perrigo (1968), states the purpose of the work-study is to improve performance and output from the facilities available to management as follows:

1. Eliminating ineffective work and unnecessary movement;
2. Improving the conditions in which operations are carried out;
3. Improving the methods by which operations are executed, and by the tools available for the job;
4. Improving layout;
5. Ensuring a better balance of workload between individual operators, groups of operators and production equipment;
6. Providing information for better and more balanced indirect operator facilitates to the direct production operatives;
7. Providing that information which enables the production planning and control function to programme a steady flow of jobs through the plant, with the right materials at the right place and at the right time to facilitate this.

He argued that there are two distinct, though interdependent, facets of work-study. These are:

1. Method study: to determine the most effective and economical way of carrying out a job; and
2. Work measurement: or time study-which, as the name implies, is for the purpose of determining the time necessary for carrying out the job.

The aim is to find the most economical and practical methods of carrying out the operations under view, so that any desirable changes may be introduced to the economic benefit of the whole organization.

7.4.4 Working Environment as a Variable Affecting Performance

7.4.4.1 Introduction

The above techniques work-study, network analysis and operation research deal with organization of capital resources according to the logic of work. Another aspect deals with the organization of capital resources with respect to the capabilities and limitations of man as part of the man-machine-method-environment system. In spite of an increased awareness and recognition of the inherent dangers of construction activity, the industry remains one of the most hazardous sectors to work in. Virtually all the literature and guidance on construction safety issues begins with some kind of statement about the industry's poor records and the need for improvement. Statistics reveal that in many countries construction is amongst the most dangerous industries in which to work. In Europe, construction accounts for over 15 % of workplace accidents although it represents representing less than 10 % of working population. In the USA, construction accounts for 19% of workplace fatalities, whilst accounts for only 6% of labour force (United States Department of Labour, 1999). In Australia, the rate of compensated injuries and disease in the construction industry is 27.4 per 1,000 workers, which is 63% higher than the all-industry average of 22.9 (NOHSC, 1999). Accidents cost money, and delay, and increase the level of absenteeism and labour turnover. So, the introduction of the basis of safety management is to encourage people to identify and respond to control the risks inherent in their work activities- those risks they create for themselves and those they create for others. The consideration of occupational health and safety (OHS) risks in the construction
industry has become more widespread in recent years, albeit forcibly. Safety method statements are now common and operation plans almost always include assessments of the risks present in the work.

Each of these factors must be considered in designing a complex man-machine-method-environment system so that the characteristics of a human being will not be a handicap to the effective organization of capital resources subsystem.

7.4.5 Application of Safety Working Environment in the Construction Industry

The need to provide a safe work environment for employees has had a long history in personal management. In Beer et al.’s model (1984) of HRM, it is acknowledgment that work system can not only affect commitment, competence, cost effectiveness, and congruence- the 'four Cs'- but also have long-term consequences for individual well-being, as Beer et al. (1984, p.154) emphasized:

'there is some evidence to indicate that work system design may have effects on physical health, mental health, and longevity of life itself’

This certainly understates the importance of safe and healthy work systems to the health of employees. Health and safety legislation and regulations provide part of the legal context of HRM, but health and safety is not simply a technical issue such as, for instance, supplying hard hats and goggles or ensuring adequate ventilation. Above all, workplace health and safety raises the question of economic costs and power relations. As Sass (1982, p.52) emphasized:

‘In all technical questions pertaining to workplace health and safety there is the social element. That is, for example, the power relations in productions: who tells whom to do what and how fast. After all, the machine does not go faster by itself; someone designed the machinery, organized the work, and designed the job.’

Few areas of HRM can be seen as important as managing people's health, safety, and welfare at the workplace. However, despite advances in occupational health and safety legislation, research and management techniques, construction remains one of the most dangerous sectors to work in. Moreover, it remains one of the few sectors where occupational health and safety performance is not improving year on year. In construction, threats to health and safety come from a myriad of sources, e.g. the physical nature of tasks, the attitudes of the employees, the culture of the industry, cost and time pressures, the uncertain production environment, client and management priorities, onerous contracts and a fragmented system of organization, whilst every jurisdiction will have its own
occupational health and safety legislation and enforcement to the individual hazards that each project presents. Furthermore, management strategies must be tailored to the unique combination of individual employees working on the project.

The role of HRM in contributing to safe working cannot be overstated, but safe working is far from easy to achieve. In particular, health and safety must be made a top priority if it is to be taken seriously and incorporated into all management-system procedures to ensure a consistent approach. However, the fragmented delivery mode and high levels of self-employment in construction inevitably means that employees must bear some degree of responsibility for their own health and safety. Furthermore, the commercially oriented, male-dominated, macho culture of construction is unlikely to promote a safety-conscious attitude amongst employees. The acceptance of risk-taking as ‘part of the job’ and the belief that accidents ‘happen to others’ have been identified as sources of unsafe behaviour on many construction sites (Lingard, 2002). These attitudes will only be changed if employers demonstrate that risk-taking is unacceptable, and that safe working is a non-negotiable condition of employment. This requires high safety standards, safety issues driven by senior managers, effective systems, continuous training, and education programmes to alter attitudes and behaviour, and effective indication and communication strategies to ensure an awareness of occupational health and safety issues and their importance to the project management team.

7.4.6 The Quality of Work Life as a Variable Affecting Performance

7.4.6.1 Introduction

The quality of the working environment of the organization can influence the quality of work, productivity and employees’ motivation to work. This idea is also known as Quality Work Life (QWL). The concept of QWL was formed in the 1970s as an important ingredient in job design or when restructuring a job. The philosophy behind improving the quality of working life is that employees will normally be more productive if they actively enjoy the work experience, rather than just tailoring their lives at work or culture of the workplace by:

- allowing people to be more involved in the production process by participating in problem solving and decision making;
- improvement of environmental conditions;
- increasing the flow of communication within the organization;
- employee involvement in target setting;
- introduction of staff development systems;
- having employees solve workplace problems;
- better leadership styles and interpersonal relationships;
- stress-reduction programmes.

7.4.7 The Importance of Working Environment in the Performance of Workers in the Construction Industry

It might be reasonable to assume that advances in technology and management techniques in the industry would have made it a safer place to work in recent decades, but this appears not to be the case. Within the UK death rates continue to rise despite the introduction of the Construction (Design and Management) Regulations (1994), and in Australia, construction-site deaths have remained at the same high level for the past three years, the industry killing more workers than any industry except agriculture (Loosemore, M. 2003). The reasons provided for this lamentable performance have been numerous, and they include the industry's 'macho' culture, time and cost pressures, the uncertain and technically complex nature of construction work, the fragmented organizational structure, and the relatively hostile and uncontrollable production environment, etc. (Suraji and Duff, 2000). Whatever the causes, the industry's occupational health, and safety (OHS) performance is unacceptably poor, and construction sites remain one of the most hazardous environments in which to work in.

One of the reasons why construction organizations have failed to develop the intellectual capability to analyze their risks thoroughly may be related to the complexity of potential causes of OHS incidents ranging from inappropriate work practices and site planning to the careless behaviour of individual employees. However, broadly speaking, most problems arise from the following principal factors which mean that a successful OHS strategy should also be built around them:

- working conditions;
- the tasks being carried out;
- employees’ attitudes and human error;
- economic conditions;
- management goals;
- government and institutional policy;
- industry structure.
7.4.8 Safety Behaviour: It's Influence on Attitudes of Workers in the Construction Industry

There are environmental factors that influence attitudes towards safety of construction workers in the construction industry. The researcher sees that accidents are caused by environmental factors, latent hazards in the nature of construction work owned by the individual workers as well as the psychological factors (Leather, 1983a; Duff et al. 1994; Lingard & Rowlinson, 1994). The environment factors were seen as:

1. Site conditions (e.g. access to work, etc.),
2. Site tidiness,
3. Availability,
4. Inter- and intra-group co-operation,
5. Control and supervision of work,
6. Effectiveness of long-term planning,
7. Role and position of the safety officer and safety representatives,
8. Pay structure.

The psychological factors consisted of:

1. Care and attention by the individual,
2. Skill and experience of technical resources,
3. Safety training,
4. Origins of safety norms,
5. Accuracy of subjective risk evaluations,
6. Perceived responsibilities,
7. Feeling of competent autonomy or fatalism.

Of these two themes, the environmental factors have been, in the main, legislated for and are in the realm of mechanistic regulations about guards, safety risks, personal protective clothing, protection at depths and heights, collecting statistics, etc. The psychological issues are a more recent addition to the safety research agenda (Booth, 1993).

Dester & Blockley (1995 pp. 17-26) defined of safety culture as:

"the set of beliefs, norms, attitudes, roles and social and technical practices which are concerned with minimizing the exposure of individuals, within and beyond an organization, to conditions considered dangerous or injurious" (citing Pidgeon et al. 1991).

Referring to the work of Heinrich et al. (1980), Dester & Blockley (1995) see the accident process as an incubation period, and cites behaviour, management, safety
culture, and social factors as being possible hazards. This leads to what Blockley describes as the hazard content of the project or 'proneness to failure' (Blockley, 1992 pp.13-22). They then go on to discuss the tendency to focus on the behaviour of the manual workforce as the 'trigger' of hazard events:

"This is an implicit assumption that it is they who are at fault. However, working practices are influenced by the requirements, demands and expectations of clients, designers, consultants, educationalists, researchers and clients are reflected in the beliefs, attitudes and behaviour of construction workers." (Dester & Blockley, 1995 pp. 17-26)

If this is the case, then the study of attitudes and behaviors of construction workers will enable a better understanding of their underlying motivations, and so this understanding can be used to improve behavioral management techniques. Wilson (1989 pp. 303-319) deals with organizational behaviour and safety management, and the point he makes is that the paradigms used for manufacturing industry are not directly transferable to the construction industry, which is based on organic organization rather than the mechanistic systems of manufacturing sector. As a consequence, he makes the following points by way of interpreting this view of industry:

"There is no doubt that decision making and discretionary power are delegated widely throughout construction industry organizations. Much of this is due to professionalism of the workforce, on the one hand, and to the fragmentation of work within organizations on the other."

"Knowledge was acquired on the site by the learning process of 'sitting by Nellie'. Inevitably, this involves considerable 'trial and error' ... the resultant knowledge and experience is the means by which safe and unsafe acts or conditions are assessed. In the absence of other means of assessing danger, experience becomes the most powerful tool for motivating or de-motivating safe behaviour."

Herein lay a series of problems. The amount of delegated decision making, discretionary power, informal training and loyalty to peer group on the construction site provides a context within which accidents can easily happen unless a sufficiently robust system of self-regulation exists. This system could well be embodied in the concepts of culture as described by Dester & Blockley (1995) but, as found by Lingard & Rowlinson (1998), this system cannot function without an adequate safety infrastructure being provided by management. These issues are also discussed by Seymour & Hill (1996, pp.655-667). They discuss the role of the first line supervisor, and point out that a culture has evolved in the construction industry to compensate for the deficiencies of formal management provision. This reflects the views of Tavistock Institutes in the 1960s which addressed the issue of management of the procurement system, and indicated that the
informal system of side dealing was necessary to make up for the deficiencies in the formal control system. It seems that 3 decades later this same problem still exists, and is particularly acute in the realm of construction site safety. In order to deal with this, they commented that foremen are of the opinion that:

"Because of the uncertainty and interdependence, because of the difficulty of supervising a constantly changing site, an operative's ability to act without detailed instructions and to have the right attitude is important to them."

"...they value the ability to 'get stuck in', sort out problems, to be flexible and reliable in the face of the uncertainty and unpredictability which is inevitable. The means of obtaining compliance are primitive: the threat of dismissal or cultivating networks of personal loyalty."

This approach is understandable, but the right attitude may not be a safe attitude, and the incentives to 'get stuck in' may well be counter-productive in terms of safety performance. The work undertaken by Duff et al. (1994) and Lingard & Rowlinson (1997) was predicated on such concepts; behavioral safety management aims to change attitudes by providing a framework within which existing attitudes can be explored and modified with the ultimate goal being safer performance. From the research done by Langford et al. (2000) has identified five factors that influence operatives’ attitudes to safety management. These five factors (Fig. 29) have been termed:

- Organizational policy,
- Supervision and equipment management,
- Industry norms,
- Risk taking,
- Management behaviour.
ENVIRONMENTAL FACTORS

SAFETY MANAGEMENT IMPLEMENTATION
- Company & supervisor
- Safety management system
- Safety infrastructure

ATTITUDES ABOUT SAFETY MANAGEMENT
- Attitudes & safety performance

BEHAVIOURAL FACTORS
- Historical Factors
- Economic Factors
- Psychological Factors
- Technical Factors
- Procedural Factors
- Organizational Factors

Fig. 29 The Model of Langford et al., (2000 p.136)

The importance of these findings is that they have identified the aspects of company safety management that lead to positive attitudes to safety by workers. By paying attention to these factors, it should be possible for employees to engender positive safety attitudes in the construction industry, then positive safety attitudes is an essential prerequisite.

The important issue raised by Langford et al. (2000) in his research, is the way that the five influential factors may be loosely classified as 'cultural issues'. All five, to a greater or lesser degree, relate to the 'way in which safety is managed around here'. Perhaps the most central general issues are the influence of industry norms. An industry breeds its own culture, and this fashions behaviour and attitudes to a wide set of industry practices that members of the industry carry with them from firm to firm and site to site. Overlaying these industry norms is the level of risk taking that is expected as being acceptable in the
industry. The construction industry is attuned to risks; it extends to financial risk in developments, risks relating to timely and completions within the budgets, risks arising during the construction phase, etc. In such a pervasive culture, it is no wonder that operatives see themselves as part of this risk taking culture. Certainly, it seems to be an influential factor in shaping their attitudes to safety management.

At the level of the firm, positive attitudes can be encouraged by organizational policy of a firm to safety, the behaviour of management in stimulating good practice. Again, the issues of culture, this time at the level of the firm, are driving behaviour. If a firm has a strong culture that sees safety as intrinsically important rather than a defensive necessity, then performance is likely to be better. The policy issues is itself unlikely to shape this culture, but a policy complied with an active concern by managers to implement this policy is likely to realize an organizational culture that sees safety as important. These values are transmitted to the supervisors responsible for the day-to-day management of the safety of the workforce.

These arguments do not say that a strong safety culture at the industry level and within firms absolves the individual workers from holding to safe working practices, but without a strong culture shaped by the five factors that have been isolated their behaviour is more likely to be errant. Obviously, there are many other factors that can influence site safety, and many of these relate to the provision of an adequate safety infrastructure which each employee feels at home and can use and rely on.

Unsafe behaviour is recognized as being involved in accidents but, following Heinrich's (1980) studies, the unsafe behaviour is a trigger event, not the cause of the accident. Hence, prevention measures aimed solely at the workers are not necessarily well directed. The results of the study done by Langford et al. (2000) indicated that many projects participating and factors influence working behaviour, and most of these are actually beyond the control of the worker. Given the influence of others on the performance of workers, it is essential that management commitment to safety improvement is manifested in the provision of an effective safety management system: that is, a complete safety infrastructure must be provided that empowers the individual worker.

Langford et al. (2000) concluded from the study that safety systems management alone cannot ensure safety on site. The establishment of good relationships with operatives, unions, safety officers, and subcontractors is essential if safety is to be improved. The research done by them has indicated that co-operation between team
members, and co-ordination of safety systems, particularly on multi-occupied sites, is important. The concept of safety by group effort is one that should play a vital role in safety improvement. Pay and reward systems are seen to be a major factor in risk taking. Hence, productivity bonus systems must be carefully thought out so that supervisors and managers are not tempted to turn a blind eye to safety hazards. Safe working and productivity must go hand by hand, and rewards systems that compensate the worker for safe working whilst achieving desired levels of productivity must be devised. Two countervailing forces apply here: the economic force of bonus payment which, if for productivity, is positive towards risk taking and the positive force for experience which militates against risk taking.

By recognizing the value of human resources, construction companies can motivate and assist operatives to work more safely. In order to do this, companies must maintain and update their workers’ skill and knowledge by training, skill updates and effective on site communication. This investment in human resources must be attained despite the prevalence of subcontracting systems. The industry norm factor indicates that the construction site generates its own specific risks which are exacerbated by current industry practice that often turns a blind eye to unsafe practice.

In terms of organizational policy, the key issues emerging from the research were the need for a 'safety champion' at the top of the company, and a positive attitude by management to involving workers with management in safety system development—the idea of each worker having an involvement and ownership in the safety management system. An important finding that came from discussion on site was that safety conscious contractors believe they are disadvantaged in the current tendering system. The concept of providing a percentage sum for safety organization at the tender stage can force all tenders to price realistically for safety and give the client the opportunity to enforce safety measures in the contract (Rowlinson, 1997). In order to do this, safety practitioners would need to be drawn into the tendering team, and their role should be to ensure all aspects of safety are considered and priced.

In a discussion with operatives, it was found that one of the important factors in motivating workers to work safety was the knowledge that safety management was being seen to be done. By constant attention of management and supervisors to safety issues and by the provision of the necessary safety infrastructure, it was obvious to operatives that safe working was desired and required. In no other industry is the lack of a proper
safety infrastructure as obvious as in the construction industry, but by making the infrastructure apparent, workers are motivated to work safely.

### 7.4.9 Implication for Construction Industry

The orientation of managers is generally towards the achievement of organizational objectives, and hence there is a desire to achieve high levels of productivity as a consequence of the positive motivation of subordinates. Many factors present in the construction industry make the manager's tasks more difficult than is the case in other sectors of employment. Factors such as the lack of security, the required mobility, and the nature of the operations and the structure of the industry influence the extent to which managers are likely to succeed in motivating employees. Many of these factors are outside the control of managers, since the Government’s building programme and the state of the economy as well as the nature of the product influence them. Factors, which attract many employees to the industry such as ‘the outdoor life’, also result in many older workers moving to jobs in other sectors of the industry or elsewhere in order to gain security and possibly work which is less physically demanding. The problem facing the industry may be summarized as the need to attract men with the necessary abilities, the need to retain skilled personnel within the industry and the motivation of employees to contribute effectively. The decision to enter the industry is based on the attractiveness of the reward-effort bargain and the expectation that these rewards will satisfy individuals’ needs both in the short and long term. The decision to remain, or more commonly to leave, the system is based upon the extent to which these expectations are fulfilled, and alternatives are perceived as less attractive when viewed overall. The level of contribution whilst the employee is a member of the system would appear to depend upon a number of factors, but important amongst these are the reward anticipated and their perceived relationship to effort expended. Such decisions appear to be based in large measure upon the rewards offered, both extrinsic and intrinsic i.e. the motivation package. The manager will inevitably be constrained in the extent to which he can manipulate the variables. Government pay policy, company, and national agreements are major constraints, and any changes to the motivation package must be considered against such a backcloth. It appears inevitable that a sub-optimal solution will exist particularly since, as stated earlier, man is a complex being and his response is not entirely predictable.

The manager is able to influence the following variables in the organization:

(a) The people
(b) The work and structure of the organization

(c) The systems and procedures

The change strategy decided upon may relate to one or more of the three variables people, work/structure or system/procedures. The decision regarding the strategy for change to overcome motivational problems will be based upon a theory or the combination of the theories of motivation. This in turn will be related to a model of organizational functioning. The models forming the basis for the diagnosis will reflect the manager's understandings of the nature of the complex inter-relationships of many variables. In addition, however, it is necessary to decide the means to be employed in order to achieve the changes. The latter requires careful consideration since the strategy adopted for implementing change influences the likely outcomes of the change programme.

The manager is responsible for managing the change programme. He must decide the tactics to be adopted for planned change. An important consideration will be who to involve in the process and at what stage. Decisions have to be made about data collection, its extent and methods to be employed. The manager is also responsible for ensuring that the experiences gained from a change programme are effectively utilized when the organization tackles future problems. It is clear that where motivating employees is evident, much managerial effort is required to develop appropriate solutions. Without adequate diagnosis it is likely that changes made will not offer a solution, and in fact may even worsen the problem and make its solution more difficult. For changes in behaviour to take place, there is a need for a change in attitudes and beliefs. Such changes only result where the parties concerned invest time and energy to achieve the change. The role of the manager is to manage the process of change by ensuring that problem is identified, an appropriate solution formulated, and change is well implemented.

7.4.10 Promoting the Health of Construction Workers

An improved productivity of the workforce translates into a more productive business. While various motivational factors have traditionally been applied to stimulate motivation of people in order to improve their productivity, the potential of improved productivity through health promotion has only recently become the subject of investigation.

It is long been recognized that good health is an important factor in employee efficiency and productivity (Fielding, 1990), and can lead to better performance, both physically and mentally. Healthy people are less likely to be absent from work through
illness, are more likely to cope better with stress, are less likely to suffer from muscular-
skeletal injuries sustained in the workplace, and generally display more evidence of job
satisfaction (Cooper & Smith, 1995; Chu & Forrester, 1992). It therefore makes good
sense to explore avenues for improving employee health in order to reap the benefits of
improved productivity (Cox et al. 1988). Construction site work is mostly hazardous with
construction workers being exposed to range of risks such as noise and dust, handling and
transporting materials, overhead work, working with chemicals and explosives, and
adverse climatic conditions. Despite active promotion of programmes of occupational
health and safety on construction sites, the safety records remain poor.

It is difficult to find any documental evidence of the existence of health promotion
programmes in the construction industry, or of the health status of people working in
construction. However, there is plenty of anecdotal evidence suggesting that site
employees of contractors and subcontractors in the construction industry may smoke and
drink immoderately, and may maintain unhealthy dietary and nutritional habits. By the
same token, management personnel are reputed to be physically unfit and overstressed.

Noblet (193) described current health promotion strategies as falling into either behavioral
or socio-ecological approaches. The behavioral approach focuses on developing
strategies that will motivate individuals to become responsible for improving their own
general health. This approach fits well with the biomedical model where the compliant
patient/community member is expected to adhere to professional advice on what
constitutes good health behaviour. However, while most individuals generally want to
improve their health; other issues affecting their life, such as low job security may often
hinder their efforts, poor working environment, low income, or poor housing. Health
promotion based on the behavioral approach has, according to Noblet, met with only
limited success.

On the other hand, Noblet suggests that socio-ecological approach acknowledges
the reservations of the individual approach and puts forward an alternative way of
addressing the problem, based on the premise that better health can only be achieved with
accompanying environmental and organizational support from employers. This support
would be most helpful in the form of participatory decision making, empowerment, skill
development and training, and job autonomy and flexibility. Despite the latter
recommendation, few studies have so far initiated this kind of approach, and by far the
majority of documented health promotion programmes have focused on individual
behaviour change. Webb et al. (1988) undertook a review of workplace health in Britain,
and reported that this was the case, recommending that new initiatives should take the form of comprehensive attempts to address all aspects of health at work, through changes in policies and working practices as well as in individual lifestyle.

Fielding’s overview of worksite programmes in the US (1990) showed that most focused on one health risk activity such as fitness or nutrition. Overall, this review reported conflicting results as to any effectiveness in reduction of risk factors or sustained changes in health behaviour. A particular concern reported was the poor degree of employee participation, with fitness programmes often attracting only 15% of eligible employees. This same criticism was made by Glasgow et al. (1993) who pointed out that the low participation of males, especially blue collar workers, in voluntary worksite programmes meant that programmes ended up reaching only the potentially more healthy executive members of staff.

A major concern of employers is that any effects of a health promotion programme should not only be of benefit to employees, but also should be a good business strategy. Health promotion programmes are premised on the basis that the benefit of the intervention out-weights the costs (Noblet, 1993). Consequently, many attempts have been made to investigate the links between productivity and health.

Productivity is a ratio between outputs and inputs. To improve productivity, the volume of outputs needs to increase and/or the volume of inputs needs to decrease. Improvement in health and fitness may affect both outputs (the rate of production) and inputs (resources required in the production process). A workforce who is healthier in both physical and mental terms is likely to work faster while using resources more effectively (e.g. low or no absenteeism, low accidents and industrial disputation).

7.5 Conclusion

This chapter has dealt with the Organization of Project Information Subsystem, the Organization of Capital Subsystem and the Organization of Resources Composition Subsystem. The study considers the organization of capital resources as consisting not only of an arrangement of physical facilities, but also of decisions relating to job planning, development and implementation of optimum construction methods, logistics, controlling and monitoring and capabilities and limitations of man as part of man-method-environment system.

Also, the study insists on the need for greater concern with the content of the information provided to management, and the need for more recognition of the fact that the
production and the delivery of information should itself be systematized has led to recognition of the importance of the organization of the information subsystem. This thesis argues in the spirit of integration of HRISs into construction company activities, in terms of their function in the organization as support to management.

In the section concerning organization of resources composition, the study suggests that adjustment of organization composition in the construction industry is important for all levels. The study defines factors contributing to the organization of resources composition which is very important to realize that, they are highly inter-related.

There is a direct relationship between effort-performance-satisfaction and this relationship is affected by many variables, such as individual needs, abilities, perception, job characteristics, work environment, organizational structure, and job design. The balance of both extrinsic and intrinsic rewards and their perceived equity to the individuals are crucial. The match between individuals needs and expectations, and factors such as work conditions, relationships, salary, job design and the manner in which these factors are balanced, can lead to high or low levels of motivation amongst individuals. Finally, motivation is a vitally important concern to both the employee and employer within an organization. Its importance arises from the simple but powerful truth that poorly motivated people are likely to perform poorly at work and gain little satisfaction from their job.

7.6 The Main Variables of Organizations of Project Information, Capital and Resources Composition Subsystem as Conclusion

The study has been given an increasing interest in examining the links between Managerial Activities (variable 1.1) and System Performance (variable 9.1), considering the link in a construction context and has argue that there is an absolute necessity to place HRM (Human Resource Management) issues at the center of decision-making.

The function of Human Resource Management (HRM) as dependent variable (variable 3.1) is considered a core Managerial Activities as a independent variable (variable 1.1), rather than a specialist support function, and is considered good practice for anyone with managerial responsibility to be involved with employee management issues (Cornelius, 2001).

The Organization of Project Information (variable 2.5), the Organization of Capital Subsystem (variable 2.6), and the Organization Resources Composition Subsystem
(variable 2.7) as primary variables will cause an effect on Human Resource Management (HRM) as dependent variable (variable 3.1). As Peter Drucker (1980) remarked that:

"The manager has a specific tool: information. He does not handle people; he motivates, guides, and organizes people to do their work. His tool, his only tool, to all this is the spoken or written words or the language of numbers."

Turin (1969) argued that: "human resources, materials, plants, and tools are the major factors of production. A manager is a person in an organization who is responsible for the work performance of one or more other persons."

Also, the Organization of Project Information (variable 2.5), the Organization of Capital Subsystem (variable 2.6) and the Organization Resources Composition Subsystem (variable 2.7) as primary variable will cause an affect on Resource Effectiveness & Efficiency (variable 4.2), Health and safety (variable 4.6), Working Environment (variable 4.7), Working-life Balance (variable 4.8), and Human Resource Information (variable 4.9). Fielding, (1990) insured that: 'it is long been recognized that good health is an important factor in employee efficiency and productivity, and can lead to better performance, both physically and mentally.'

Human Resource Planning (variable 4.1) is the main function of the Human Resource Management (variable 3.1). Recruitment (variable 5.1), Selection (variable 5.2), and Training and Development (variable 5.3) are the main basic functions and components of Human Resource Planning (HRP) (variable 4.1)).

The object of Training and Development (variable 5.3) is to alter the behaviour of employees in a way that will create improvements in the achievement of organizational goals. It provide opportunities for an employee to learn opportunities for an employee to learn job-related Skills (variable 6.1), help people to acquire Knowledge (variable 6.2) and changes in individual Ability (variable 6.3) changes Attitudes (variable 6.4). Encouraging employees to work in a way which leads to better-quality products and therefore a more positive organizational images demands that they are trained and developed in a way which strives to achieve quality improvements.

In accordance changes in these four variables, Skill (variable 6.1), Knowledge (variable 6.2), individual Ability (variable 6.3) and Attitudes (variable 6.4), will cause changes in the following end result intervening variables:

a) **Highly motivated and satisfied worker**, variable 7.1, as Pigores and Mayers 1969 (ed. Shaddad 1983) argued that: ‘. when employees are so well trained that they experience direct satisfactions associated with a sense of achievement and the knowledge that will develop their inherent capabilities at work’

b) **Competence worker**, variable 7.2, as ILO's report 1998 stated that: "..retains a job, improves their productivity at work, and their income earning..."
c) **Healthy and safety worker**, variable 7.3 as Levitt *et al.*, 1976 (ed. Shaddad, 1983) argued that: "..reduces accidents, increase output,"

d) **Low absenteeism and turnover**, variable 7.4, as Pigores *et al.*, 1969 (ed. Shaddad, 1983) argued that: "..Dissatisfaction, complaints, absenteeism and turnover can be reduced..."

e) **Continuity of production**, variable 7.5, as King *et al.*, 1964, (ed. Shaddad, 1983) argued that: "..reduces learning (cycle) time; this is almost the traditional result of improved training methods,

f) **Cost control and project effectiveness**, variable 7.6, as Glueck 1974, (ed. Shaddad, 1983) “Training can reduce waste, and increases output..."

g) **High quality of production**, variable 7.7, as De Simon 1966, (ed. Shaddad, 1983) argued that: “Better quality is often quoted as a benefit of improved training method..." and

h) **Machine utilization**, variable 7.8 as Shaddad (1983) argued that: “improving the ability of an operator can affect machine utilization”

Consequently these changes will affect the end result Efficiency variable 8.1, **Effectiveness** variable 8.2, and **Competence** variable 8.3, and the end result variable which is **System Performance**, variable 9.1, as Martin *et al.* (2003) stated that: "..where those industries which invest in training tend to perform better and have a more positive public image than those which do not".

The general and task **Environmental Subsystem**, variable 2.3, will influence every variable in the system.
Chapter 8: Effectiveness, Efficiency and Competence as Important Factor to Productivity and Performance of Workers

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8.2 Construction Efficiency
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EFFECTIVENESS, EFFICIENCY, AND COMPETENCE AS IMPORTANT FACTORS TO PERFORMANCE OF WORKERS

8.1 Introduction

The construction industry has long been trying to incorporate improvements similar to those prevailing in the manufacturing sector. Those efforts were directed by several factors that appeared significant when first considered but lost relevance over years. Many industries adopted the specialization principles directed by Taylor (1947), and these methods paid dividends for many years. However, they eventually led to "silos" of specialization, lack of communication among groups working with different production processes, and therefore, inefficient production process. The types of performance measures imposed by Taylor's principles redirected the focus from the customer, external or internal, to the internal hierarchical organization. The consequences were loss of customer satisfaction, loss of market share, and loss of profits.

Technological advancement in the mid-1980s, led to increasing automation in both administrative functions and fabrication/construction. The intent of automation was to improve the efficiency of existing processes, but not necessarily their effectiveness. Services and products were generated faster, but the quality of products/services, and associated customer satisfaction elements were not specially addressed. As a result, the industry shifted emphasis from automation to management initiatives that focused on quality improvement driven by customer satisfaction.\(^1\) It is useful to integrated good business practices and good technical practices through good project management to achieve better product/service delivery.

A project is a planned set of activities that meet specific goals and produce specific outputs. Every project moves through a life cycle, i.e., a series of phases from conception to retirement. The main objectives of any project are improvements in time, cost, and quality control.

\(^1\) The three founding fathers of quality, Deming (1988), Juran (1988), and Crosby (1979), were followed by other management consultants, each one preaching a slightly different flavor of quality. Acronyms such as abounded, e.g. TQC (total quality control), TQM (total quality management), and TQI (total quality improvement).
Traditionally these three objectives have been considered as competing. Better quality implies more time to complete a project and higher costs directly related to longer times of production period or, for example, of better material. Reducing the time required to complete a project implies higher costs because of the mobilization of more resources or lower quality if resources remain the same. Good practices and good management can eliminate the conflict between these three objectives and enable them all to be met simultaneously.

8.2 Construction Efficiency

The human element as represented by the construction workforce is the main catalyst/determinant variable of construction efficiency and productivity. The efficient workplace that allows the convert resources into a built product is largely dependent on the sign of technology, the sociological environment of the contracting organization and the setting of the construction site. The ability of the manager to make the work environment conducive to optimum productivity will determine the success of projects in meeting time, cost, and quality targets. That is the main task of getting the best from the workforce.

Construction work environment is a product of organizational response to providing the needed adequate production resources and workers' assessment to this response as reflected to their motivation and productivity. Personality reflects worker qualities, knowledge, attitudes and characteristics; for example, training, experience, age, perception and so on. Clearly, personality changes with time, (as such parameters are being static), implies management's need constant monitor and alertness for changes impacting productivity. This information can be used the by manager in setting up programmes for increased output from workers.

In addition, workers' identity or personality management should be aware of workers’ managerial perception in order to effectively direct the workforce to higher productivity while at the same time maintain a trouble-free work environment that would satisfy the workforce with good team spirit. This perception will depend on management's contribution to the work environment in terms of work organization, supervision, efforts to progress on site, participation by management and operatives' awareness of management's efforts.
8.3 Organization Effectiveness

Effectiveness is a very important variable in the improvement process of an organization. It is important in creating and designing effective organization is discussed by Hitt (1988). Yet, Steers (1975) and Zammuto (1982) described the measurement of effectiveness as one of the most problematic issues in the field of organization theory. The researcher has offered a variety of models for examining organizational effectiveness, yet there is little consensus as to what constitutes a valid set of effectiveness criteria (Cameron and Whetten, 1992; Lewin and Minton, 1986). According to Das (1990) the definition and, consequently, the criterion and approaches employed in evaluating organizational effectiveness are various and, in some instances, paradoxical as shown by the variability of definitions. Georgopoulos (1957) referred to it as the extent to which an organization, as a social system, fulfills its objectives without incapacitating its means and resources, and without placing a strain upon its members. Yuchtman and Seashore (1967) defined it as the ability of the organization, in absolute or relative terms, to exploit its environment in the acquisition of scarce and valuable resources. Price (1972) described it as the degree to which multiple goals are achieved, while Freeman (1977) describes it as the degree of congruence between organizational goals and definite observable outcomes. Pennings and Goodman (1977) suggested that an organization performs effectively if the relevant constraints imposed by the constituent of the organization can be satisfied, and if the results meet (or exceed) a set of criteria that constitute the multiple goals. Miner (1988) defines the effective organizations as those that receive inputs, transform them into outputs, export them to environments, monitor changes in the environments, and take corrective actions to ensure their survival.

Although there is some degree of overlap, it is apparent that variety of approaches exists as to what constitutes organizational effectiveness. Many variables are being used as indicator and predicators. Campbell (1976) found over 25 types of variables that fall into three general classes: economic and technical such as profits, growth, productivity, and quality of products and services; social such as workers' turnover, involvement, and morale; organizational characteristic such as the level of flexibility and control.

8.3.1 Approach to Effectiveness Literature Review

Models and approaches used to understand organizational effectiveness can be classified into three general classes. First, the qualities of organizational approaches,
these are the models that attempt to relate effectiveness to certain organizational characteristics such as the degree of formalization, openness of communication, level of control and other qualities related to organization structure, culture and strategy. Second, the goal-setting approaches models that fall into this category use the degree of achievement of a certain output(s) as an indicator of organizational effectiveness. Third the systems approaches, these here are models that emphasis the organization as a system and attempt to assess the effectiveness of the system in terms of its input, transformation, and output. Models that fall into this category include the resources model which views effectiveness as the ability of the organization, as a system, to exploit its environments; the internal process model where effectiveness is judged by the efficiency of the process inside the system; the strategic adaptation model which recognizes and judges effectiveness by the degree of adaptability to external forces; and the open system model which views the organization as an open system. Effectiveness here is indicated by the ability to meet internal and external challenges, and the multiple constituencies approach that defines an effective organization as one that satisfy the demand of those constituencies in its environment which are from which it requires support for its continued existence.

There are other approaches that utilize a configurational view of organizational strategy, structure, and dominant values to analyze effectiveness. These approaches define the ideal type or configurations that organizations tend to pursue as based on their structure, strategy and dominant values. Effectiveness is determined by how close the characteristics of the organization are similar to that of a configuration. Included here are Miles and Snow's (1978) typology that identified four ideal types of models based on strategy: the prospector, the analyzer, the defender, and the reactor. Mintzberg's (1979) typology identified five ideal types based on structure: simple structure, machine bureaucracy, professional bureaucracy, and divisionalized form and ad hoc. Quinin and Rohrbaugh's (1983) identified four ideal types of organizations based on dominant values of structure context, focus and strategies means and ends.

Gameson (1992) found that one in five commercial construction clients were dissatisfied with the service received. One of the reasons that lead to such a low performance is the use of inappropriate measures to assess effectiveness. Improper assessment by organizations leads to inaccurate conclusions, which in turn result in a substandard performance. Although most managers use some indicators (mostly financial) these do not capture all of the entire salient elements of effectiveness, and cannot be
relied upon as predicators of effectiveness. The development of better methods to measure effectiveness should be a high priority in order to achieve and maintain improved performance.

A number of researchers have noted that, when developing effectiveness measurement, it is important to specify whether it is the variables that predicate effectiveness or the variables that indicate effectiveness that are of interest (Cameron, 1986). Cameron and Whetten (1983) and Cameron (1986) suggested that in order to develop accurate measurement at the organizational level, variables/measures must be combined into an overall model that indicates performance in the multiple domains; they may perform well only in limited numbers. Tsui (1990) argued that this multidimensional view of performance implies that different patterns of relationships between organizational performance and its determinants will emerge. Miller and Friesen (1984), in their study of organizational effectiveness and its analysis, suggested that researchers should attempt to use an approach based on recurring patterns of attributes or configurations of attributes that relate effectiveness empirically. According to Meyer et al. (1993) using configurational approaches in organizational analysis represents a holistic stance. Rather than trying to explain how order is designed into the parts of an organization, configurationally inquiry tries to explain how order emerges from the interactions of these parts as a whole.

Dotty et al. (1993) suggested three main steps in order to develop valid quantities models based on configurational inquiry. First, organizational configurations identified approach must be conceptualized and modeled as ideal types where effectiveness is highest. This is necessary because the fit among the contextual, structural and strategic factors is at a maximum in these configurations. Second, organizational characteristics which represent the different effectiveness domains in the ideal types must be integrated into an overall multivariate profile or model. Then the level of these characteristics must be determined against a valid measure of effectiveness. Third, based on an assessment of the level of these characteristics in the organization, the overall model can then be used to predict the effectiveness of the organization.

8.4 Competitive Organization

8.4.1 Introduction

Modern society is undergoing a process of transformation of an unprecedented magnitude and speed which affects all spheres of economic, social, and political life. The combined forces of globalization and rapid technological change drive the transformation,
particularly by innovations in information and communications technologies. At the same time, there is deregulation and liberalization of grouping. The result is a highly competitive global economic environment. The new global economy is based on market principles, liberalized trade, relocation of production and a very rapid international movement of information and capital. In this environment the organizations, the engine of innovation, growth, and employment, faces unprecedented challenges and undergoes a profound transformation. Not only are internal company structures and methods of work changing, but also corporate relationships to the external environment. The need to adapt quickly to global environment is forcing firms to strive for higher productivity, flexibility, and innovation.

To respond to the three "Cs" of this new environment-competition, change and the customer- the watchword for organization has become flexibility. Competing in the global economy will require more than educating and training workers to meet new challenges. In addition to retraining the work force, successful companies will institute quality improvement process, and introduce change programs (e.g., involvement programs). The work force must learn to become culturally sensitive in order to communicate and conduct business in foreign countries.

8.4.2 The Competitive Pressure

Competitive pressures, both in domestic and in global markets, shifted the management of employment relationship away from compliance and quiescence in employee behaviors to a more positive commitment towards customers and business requirement. Implications, for management behaviour and employee relations, of these developments have been taken up in the debates about human resource management. Ideas originated in the USA, beginning with the argument in the Excellence Literature (Peters and Waterman, 1982; Peter and Austin, 1985) that people should no longer be treated as a "cost", but as a company's greatest "asset", and central source of competitive advantages, were academically developed by the Harvard School (Beer et al., 1985) and at Michigan (Fomburn et al., 1984). The competitive environment requires a more strategic and concentrated approach to personal management, line managers and corporate strategies. In the U.K. the ideas have been critically reworked since the 1980s (Guest, 1987; and 1989b, Storey, 1989, 1992; Sisson, 1996) at least partly in the area of evaluating the extent of change in practice. According to one company executive of
Thomas Telford UK, Construction Company it is important to take the training of its workers more to meet higher quality of services required by client (Mike Walter, 1998).

Faced with increasingly stiff competition from both domestic and foreign companies, organizations have identified quality as a critical competitive factor. One way to improve quality is to design and implement a popular techno-structural intervention strategy referred to as the total quality programme (TQM). This is defined in international standard as:

A way of managing an organization which aims at achieving continuous participation and cooperation of all its members in the improvement of:
- Quality of product and services,
- Quality of activity,
- Quality of goals.

This is important to achieve customers' satisfaction, long term organization's profitability, and benefit of its members in accordance with the requirements of the society.

8.4.3 Competitors in Construction Industry

There has been increasing interest in examining links between personal and development activities and business performance ever since the introduction of SHRM ideas. It is essential to the contemporary view of SHRM put forward by Marchington and Wilkinson (2000), who argued that while human resource considerations should reflect business strategies, business strategies should also reflect human resource considerations. However, it is evident that neither is widely achieved in the construction industry, where HRM is too often treated as an afterthought. In many construction businesses the personal or HRM function is regarded as an administrative overhead, or as a necessary burden to deal with the mundane aspects of people management such as payroll, recruitment, and the legal requirements. This explains why so few construction companies have HRM representation at a board level. However, despite the increasing tendency (and desirability) of companies to develop many aspects of HRM responsibilities to line managers, there remains a crucially important role for the HRM specialist in managing the strategic aspects of functions. According to Armstrong (1996), the personal function should contribute to organizational effectiveness by adding value to its products and services and by contributing to competitive advantage. He argued that this is best achieved by:

- ensuring a positive quality and performance-oriented culture;
• recruiting the right people, motivating them, ensuring their commitment to organizational values, and deploying them in such a way that they contribute effectively to the organization;
• ensuring that SHRM initiatives are treated as investments on which proper return will be obtained;
• delivering cost-effective personal services.

Competitive advantage is crucial to the growth and prosperity of any business, and involves the achievement of an advantageous market position to enable the consolidation and expansion of market share in relation to competitors. In order to sustain a competitive advantage any organization must commit itself to the improvement, and innovation, and the change of each of these relies on the quality of an organization's human resources (Porter, 1990). Thus, a key strategic role for the SHRM function is to embed, within the psyche of its employees, the need to innovate, improve and adapt to change. However, this can be a difficult proposition within many construction companies where there exists an ingrained opposition to changing working practices and cultures that have survived several generations. Changing culture so that people are willing to adopt and accept new ideas will require breaking down occupational stereotypes and a sustained commitment to rewarding the attitudes, thinking and performance necessary to change and innovate. This may run contrary to many of the personal-management practices upon which the industry has been founded.

8.5 Productivity Improvement in the Construction Industry

8.5.1 Introduction

Improving productivity is a major concern of any profit-oriented organization. Productivity represents the effective and efficient conversion of resources into marketable products and determining business profitability. Productivity is the relationship between physical output and one or more of the associated physical inputs used in the production process, broadly conceived, as a system concept which can apply to various entities ranging from an individual or a machine or a company, industry, or a national economy. Physical process productivity, typically expressed as a ratio, reflects how efficiently resources are used to create output.

Although partial productivity measures are most common, it is important to recognize productivity as influenced by many factors, such as: the amount and technical sophistication of capital equipment, the quality and availability of raw materials, scale of
operation, organizational work flow, and managerial competences. Productivity is an expression of the level of the technical and work organization rationalization of production, the output of the working person is able to produce with the aid of the means of production.

The Concise Oxford Dictionary (9th ed.) defines productivity as the ‘capacity to produce, the state of being productive; effectiveness of productive effort, especially in industry; production per unit of effort’. While providing a good start point, this definition uses the word ‘productive’ in defining productivity but, importantly, three distinct productivity concepts are brought out: (i) the capacity to produce, that is the force behind production itself, (ii) effectiveness of productive effort as a measure of how well the resources are utilized, and (iii) the production per unit of effort (or rate) to measure the output of production factors over a defined period of time. Definition offered by different authors, are commonly limited to only one or two of these three. Concepts economists define productivity ‘as the ratio of physical output to physical input, thereby reflecting only the third component, rate.’ English and Marchione (1983), argued that output involves not only quantity but also quality, and attempted to define the true input dimensions to embrace raw materials, capital and wages together with management, organization, ingenuity, creativity and attitudes. Indeed, managerial input into the production process, while often invisible, obviously has a great influence on productivity levels.

The argument of English and Marchione was further buttressed by Fenske (1985), in an analysis of the meanings of fifteen different definitions of productivity. He agreed that productivity is a ‘tangible reality’, but instead of limiting it to physical outputs and physical inputs, he suggested the inclusion of invisible services. He thus defined productivity as ‘the amount of goods and services produced by a productive factor in a unit of time’. Levitt (1982) went further and defined productivity as ‘the ratio between the value of a unit of output and the cost of all of the inputs as a better alternative.’ However, the definition in Davis (1951), the degree to which the power to make or provide goods or services having exchange value is utilized as measured by the output from the resources utilized’- seems to occupy the ‘center ground’, incorporating the three main characteristics of the productivity concepts.

The difficulty of determining productivity in the construction industry context is further compounded by problems in measuring and comparing the value of outputs over a long period, since the price of a given input or output varies due to such changes in factors as:

(a) The general level of prices; that is, inflation.
(b) The supply-demand equilibrium for a given resource, causing its price faster or slower than prices in general.

(c) The quality of the output.

Other problems include identifying outputs; they being no single and common physical term to measure output in construction. Thus, for the national level productivity estimates, output is usually established by two methods: (i) the total monetary value, which has the advantage of combining all forms of output, and (ii) functional units such as number of residential units, other buildings in terms of floor area, power plants in terms of kilowatts and so on.

Governments and construction firms now appear more aware of construction productivity, and the associated effects on the standard of living. The Latham review suggested that productivity improvements of up to 30% by the year 2000 are necessary to face the challenges on the next millennium (Latham, 1994). As mentioned before, the construction is a labor-intensive industry, and moreover the labor component comprises the greatest risk in the contract’s cost estimate and success. Consequently, the impact of labor productivity on the project can vary significantly by the matter which underlines the importance of proper management of human resource.

The theory of the behavioral sciences suggested that four primary determinants of organizational productivity: the environment, organizational characteristics, work characteristics, and individual characteristics. So, it is important to establish a conceptual framework for organizing and interpreting behavioral science approaches to productivity improvement. Broadly speaking, changes in organizational and work characteristics (casual variables) are seen as influencing various individual characteristics (intervening variables) which in turn affect three end result variables: work behavior, job performance, and organizational effectiveness. Productivity indicators can meaningfully be compared for all three-end result variables.

The term ‘Productivity’ has various connotations. In one context it may mean the substantive analysis of technology and operating system of a factory. In another it might mean the subtle motivational aspects of the management of white-collar workforce efforts. In yet another context, the emphasis might be on long-range improvement in financial results through inventory control. Eza (1981) defined productivity as a measure of how well resources are brought to organizations and utilized for accomplishing a set of results. Olomolaiya (1990) used a widely known efficiency equation to measure productivity:
Efficiency = \frac{Output}{Input} \quad \text{(1)}

Contributing, Nwachukwu (1988) defined productivity as a combination of effectiveness and efficiency. That is:

\frac{\text{Performance Achieved}}{\text{Resource Consumed}} = \frac{\text{Effectiveness}}{\text{Efficiency}} \quad \text{(2)}

As shown, productivity is the ratio of an organization's outputs (good and services) to its input (people, capital, materials, and energy), William et al., (1986). Human resource departments contribute to improved productivity and directly by finding better and more efficient ways to meet their objectives and indirectly by improving the quality of work life for employees. (Harold et al., 1985)

8.5.2 Construction Productivity

The effect of construction productivity on a nation's economy is highly significant. The Royal Commission (1986) into Productivity in the building industry in South Wales, Australia, concluded that 'through improving its productivity, the construction industry can have an important role in promoting national competitiveness, and therefore in defending living standards and achieving a satisfactory rate of growth (PRD, 1991). This argument is also supported by Stoekel and Quirke (1992). Their analysis indicated that a 10% improvement in the construction industry productivity will lead to a 25% increase in Gross Domestic Product.

The meaning of the term 'productivity' varies with its application to different areas of the construction industry, and a single industry measurement is insufficient. According to Thomas (1990), definition range from industry-wide economic parameters to the measurement of crews and individuals. Each of these measures has it own unique purpose. The term 'productivity’ is referred to as individual productivity, and is defined as the amount of goods and services produced by productive factors in a unit of time (Drewin, 1982). Productivity is usually expressed in terms of unit rate such as productivity = output/cost or work hours. Productivity, however, should be distinguished from project performance, although they are inter-related. Naoum (1994) has measured project performance in relation to the speed of construction, unit cost, time, and cost overrun as well as the quality standard of the construction.

In the construction industry, productivity factors are among the most essential data needed, and their relationship with the production process has been modeled in an
attempt to analyze the cause-and-effect analogue. Drewin (1982), for example, designed two models which were called open and closed conversion systems. The models show the complication involved in determining the results of various inter-related productive factors. When designing the model, Drewin stated ‘it is important to specify the inputs and output which need to be measured when comparing production.’ Past experience in the construction industry has shown that great variations in productions values for the same construction item are attributed to the effect of product conditions which are commonly called influence factors. Herbsman and Ellis (1990) divided the productivity influencing factors into two main groups, namely technological and administrative. The technological influence factor includes specification, design, location, and material, whereas the serenely organizational influence factor includes production, labour and social issues. Herbsman and Ellis (1990) concluded that knowledge of the reasons for productivity influencing factors to behave the way they do will have a positions effect on many related subjects such as estimating, scheduling labour, and resources management.

Nolan (1989) and Nolan O'Donnell (1995) have reviewed the various factors which affect productivity, and the debate on the problems inherent in the measurement and explanation of productivity. While it is acknowledged that it is difficult to measure and explain the concept of productivity, the debate surrounding these issues has illuminated the understanding of the factors that impinge on construction productivity (Prais and Steedman, 1986). Herbsman and Ellis (1990) have attempted to classify systematically the factors that affect the construction productivity. They refer to these as Construction Influence Factors (CPIFs), which are essentially divided into main categories: technological and administrative factors (Kane, 1980). Technological factors are related to issues concerned with the design of the project. While administrative factors pertain to the management and construction of the project, which include construction methods and procedures, equipment factors, and labour and social factors such as the compensation/reward system, skills training methods, management-employee relations and employee-supervisor relations.

While these factors work in an interdependent way to impact productivity, it is argued, in the case of skills, that skills shortages and skills gap reduce productivity (Haskel and Martin, 1996). Haskel and Martin have examined the ways in which skills raise wages and reduce productivity. If this is the case, then any skills training that eliminate skill shortages and skill gaps can play a crucial role in the enhancement of productivity (Prais, 1981). This is possible because training and development practices are necessary to
improve employees' skills, knowledge, abilities, behaviors and capabilities and hence, organizational productivity and competitiveness. As Edwards (1997:171) succinctly put it, 'labour productivity is a function of skills in the labour force, any skills in the labour force is a function of training and development'.

8.5.3 Factors affecting Construction Productivity

The definition of productivity ranges from industry-wide economic parameters to the measurement of crew and individuals. For the purpose of the study, the term ‘productivity’ is referred to as individual productivity, and is defined as the amount of goods and services produced by productive factors in a spell of time. It is usually expressed in terms of unit rate such as productivity output/cost or work-hours. In the construction industry, the relationship between productivity factors and production process has been modeled by Naoum (2000) in an attempt to analyze the cause and effect analogy.

Concern has been expressed for many years about impairing productivity on site. The view is generally held that factors at head-office level and site management level are the main constraints to poor productivity. These factors are (1) management factors, (2) employee motivation and (3) experience and training. The level of productivity attained by a firm is determined by a variety of organizational, technical, and human factors, many of them directly controlled or influenced by management decisions (Flemings 1971; Leland, 1984).

Lanfer and Jenkins (1982) examined various approaches to motivate construction workers, and found that construction management would benefit from a general move towards a more participating decision-making style of leadership. Bresnen at el. (1987) identified site management involvement in planning as a very important factor because of their input on early stages in developing understanding of, and preparedness for, their job. It has been suggested that site manager should have a major say in setting the original targets, planning the process and organizing the resources Gunning, (1984); Olomolaiya, (1990) found that good supervision is the most significant variable influencing percentage of production, and that fluctuations in productivity are primarily the responsibility of on-site managers. Rieshmidt (1976) argued that the productivity of firms depends on the management's access to accurate information to aid in faster decision-making. Several empirical studies emphasized the importance of utilizing effective resource practice in order to improve productivity. Stirkland (1987) suggested that the ability to achieve good
project performance hinges, primarily, on the attainment of forecasted productivity and manpower level.

The empirical study by Nicholls and Langford, test the hypothesis that Herzberg’s two factors theory of hygiene and motivation is an accurate way of determining the motivation of construction site engineers. Hygiene factors: money, supervision, status security, working conditions, policies, and interpersonal relations prevent dissatisfaction but do not motivate, and they do not produce output but prevent decay in performance, while motivation factor, work itself, recognition, advancement, possibility of responsibility and achievement can have a positive effect on job satisfaction which will lead to an increased output. The study shows that there has been an overall agreement with Herzberg in that site managers consider the most important factor to be the work ‘itself’. However, some hygiene factors can motivate construction employees, in particular, site manager who value responsibility and autonomy as a powerful motivator (Nicholas and Langford, 1987).

Maloney (1990) found that quality of work life includes the autonomy people are granted in the performance of their work, the participation they are allowed in making decision affecting them, and the social interactions allowed by the job. A positive quality of work life leads to a positive organizational outcome e.g. reduced absenteeism and turnover, greater job satisfaction, etc; therefore, quality of work life is a major determinant of an organization’s ability to recruit, motivate, and retain skilled workers.

So, there has been a wide support to the argument that motivation leads to high productivity, while others found that some of preconceived relationship between motivation and performance do not hold when empirically tested. For example, results of an early study by Laufer and Borcherdng (1981) indicated that financial incentive programmes and the construction labour force are not feasible, but they could also materially raise productivity, however production costs, shorten construction time, and increase the earning of workers. On the other hand, Olomolaiya (1990) did not find a significant relationship between motivation and production rate. Motivation, however, had a significant influence on the proportion of working time bricklayer’s spent productivity.

Developing individuals have considered formal education and training programmes as substitutes for leadership with the ability to work independently or with minimal supervision (Maloney, 1990; Federels and Maloney, 1992). Evidence that the worker orientation of a construction workers acts as a substitute for leadership was investigated by Stinchombe (1959) who stated that: ‘craft institutions are a method of administering
work. Craft administrated by substituting professional training of manual workers for decentralized planning of work’. Productivity is therefore closely related to skill - without skill there is no way to be productive. Workers today are comparatively well educated, so training or teaching job skills is a necessity as expressed by the hypothesis: ‘In order to grow specialization in construction process a multi-skilled professional to effectively manage construction projects is seriously required’ (Bresnen et al., 1984). The essential ingredients for success in a first line supervisor’s role are the ability to communicate with experience, planning and goal setting, all of which play a role in communication. Hinze and Kuechenmeister (1981) concluded that people who took advantages of these factors were found to be most productive. This ability is even more important on a ‘super project’ in which the workers are essentially lost without the careful guidance of a foreperson. Considerable organizational behaviour research has been conducted with the first line supervisor because of the link between management and workmen. Horner (1989) suggested that management must bear the burden of controlling the rapidly changing technological and social conditions, and that training programmes and methods of assessment must be relevant and appropriate to the needs of the organization – they must be designed and implemented in joint ventures between academia and industry.

Naoum (1996) conducted a survey to find out that there is a significant difference in perceptions between head office and site managers with regard to factors that impair construction productivity. There were overall agreements regarding the factors that affect productivity rates on construction site. Both types of respondents identified ‘ineffective project planning’ as the most crucial factor likely to impair construction productivity. This finding was supported by Borcherding and Ganer (1981). The factors that seemed to be important in matters related to resource management effectiveness were ‘difficulties with the procurement of materials' and ' disruption of site programme'. As far as material mismanagement is concerned, comments from site managers indicated that the most acute problems arise from material supply and storage which have a great impact on the sequence of work and rework due to disruptions. This finding corresponds closely with the studies of Thomas et al. (1989, 1992) who found that the average daily productivity for non-disrupted days was 0.44 work hours/m2, while disrupted days had an average productivity of 0.26 work hrs/m2, an increase of 388%. This finding demonstrates that productivity improvements can be achieved through better managerial control. Thomas et al. (1989) frequently cited problems that included the lack of tools, materials, delayed decisions, late information, and changes of order. The link between satisfaction and
improved productivity is based upon the impact that such conditions are assumed to have on the motivation of both workers and supervisors. It can be concluded, therefore, that individual needs for opportunities advancement as well as work satisfaction itself can be frustrating and, consequently, the potential of significant productivity as being thwarted by inappropriate or inadequate managerial actions.

8.6 Performance Management and Development of Management

8.6.1 Introduction

Performance management aims to generate better results from individuals, teams and the organization as a whole. Essentially, it is about planning goals, targets and standards, continually monitoring progress towards achieving them and providing support where necessary. According to Armstrong (1991), the process of performance management begins with a performance agreement between the managers, and subordinates. This comprises a set of achievable objectives, together with developmental aspects required to achieve these objectives. During the ensuing assessment period, performance against these targets is monitored and measured, and action is taken should any of the objectives prove difficult to achieve. Poor performance can be dealt with through simple motivational techniques such as coaching and/or counseling, whilst effective performance is reinforced with praise, recognition, and increased responsibility. The core principle of this approach is that problems are dealt with proactively during monitoring process and not relatively at the end of the review period. A formal review is carried out at the end of the process, where both the individual and their manager compare the employee’s achievements with the original targets, and set new targets for the coming year.

The emphasis of performance-management systems is clearly to provide flexibility in approach, supported by high-quality feedback. The ultimate form of this type of performance-management system is known as 360-degree feedback, where a variety of internal and external parties all provide an assessment of the individual’s performance. This process provides multiple stakeholder perspectives on performance, and allows the process to explore boarder elements such as teamwork and relationships, as well as traditional criteria. Those asked to provide feedback on the performance of an individual come from both within and outside the organization, and include their peers, subordinates, managers and clients. However, the very breadth of 360-degree approach—that it is close to the disadvantage of the 360-degree feedback approach – that it is costly to implement
and difficult to manage. It usually requires a considerable staff resource to manage the
data and control the process attached to it. Another criticism is that the subordinates of the
individual being assessed are unlikely to provide honest feedback if they fear retribution
from the managers in the future. This relies on a culture of openness and honesty if it is to
be implemented successfully.

Management development is the organization's primary tool for ensuring meeting
an organization's present and future needs. The goal is to ensure that the organization
provides management succession, that manager’s move through organization continually
replacing others, filling vacancies as they arise. Langford et al., (1995) discussed the
practice of management development within the construction industry. They suggested
different practices depending upon the sector of the industry in which they operate.
Moreover, they suggested different professions and disciplines have different
management-development needs. It is clear that management development is not a single
technique or programme, but a series of interrelated activities which occur together.
Langford et al. distilled the following features of the functions:

- It relates to the overall organizational strategy;
- Its success is measured in terms of the extent to which the organizational goals are
  achieved;
- It tries to harmonize the development of a manager with the organizational context as
  far as possible;
- It is an integral aspect of the structure and culture of an organization;
- It is essential to the present and future effectiveness of the organization;
- Whilst some acknowledgement is given to developing the individual manager, the
  emphasis is on ensuring that people fit well into the organization.

The list of defining features suggests that management-development approaches must be
flexible in order to cope with the changing socio-economic context of the organization.

8.6.2 Organization Performance

Throughout the last two decades a number of industries, primarily manufacturing,
have introduced new methods and techniques to shift traditional paradigms in order to
improve their performance. This has led to the creation of new philosophies, such as
concurrent engineering/construction, lean production/construction and many others such
as JIT, TQM, TPM, etc., the main driver behind those philosophies is the optimization of an
organization's performance both internally and externally within its respective marketplace.
Inevitably, this has led to the 'rethinking' of performance management systems through effective performance measurement.

Bititci et al. (1997) explained the distinction between performance management: the first ‘... is seen as a closed loop control system which deploys policy and strategy, and obtains feedback from various levels in order to manage the performance of the system second ‘... is the information system which is at the heart of the performance management process and it is of critical importance to the effective and efficient functioning of the performance management system'. Therefore performance measurement is the process of ‘...determining how successful organizations or individuals have been in attaining their objectives [and strategies]’ (Evangelidis, 1992). To achieve this, the outputs of organizational strategic and operational process are measured in a quantifiable form, to monitor the 'vital signs' of an organization (Hronec, 1993; Euske, 1984). The relationship between performance management and measurement can be seen in its wider context from a process view, i.e. input-process-output, in Fig. 30.

The basis of formulating performance indicators has been in operation as early as the beginning of the century (Chandler, 1997). Those performance indicators traditionally have concentrated on finances, e.g. return on investment, sales per employee, and profit per unit production. According to Sanger (1998), ‘financial measures are useful- but tend to measure the past- and they also, tend to measure easy types of measure the easily measurable’.

**Fig. 30 The Performance Management/Measurement Process**
*Kaglioglou et al., 2001*
Many authors such as Johnson and Kaplan (1987), Hayes et al. (1988), Crawford and Fox (1990) and Johnson (1994) identified the apparent inadequacy of financial measures for contemporary business. Neely (1999) identified the reasons for criticizing these as follows:
- encourage short-terms,
- lack strategic focus and fail to provide data on quality, responsiveness and flexibility,
- encourage local optimization, and
- do not encourage continuous improvement.

8.6.3 Performance Measurement in the Construction Industry

The construction industry's core business is undertaking projects in generating new buildings or refurbishing existing ones for a variety of clients. Therefore, it is not a surprise to find that, traditionally, performance measurement in construction is approached in two ways:

(a) in relation to the product as a facility, and (b) in relation to the creation of the product as a process. In particular, the former has been the prime performance assessment (in terms of success or failure) of construction projects. Ward et al. (1991) described how and when assessing the success/failure of construction projects, 'a common approach is to evaluate performance on the extent to which client objectives like cost, time and quality were achieved'. The 'three traditional indicators of performance' (Mohsini and Daviudson, 1992) were used in UK construction industry. Although the 'three measures' provide the indication as to the success or failure of a project they do not, in isolation, provide a balanced view of the project's performance. Furthermore, usually their implementation in construction projects is apparent at the end of the project, and therefore they are classified as 'lagging' rather than 'leading' indicators of performance. Ward et al. (1991) also suggested that 'looking back on the conduct of a project, what sticks in the mind is often not so much financial success or early completion, but memories of other people involved and abiding impressions of harmony, goodwill and trust or, conversely, of arguments, distrust and conflict'. The client's willingness to pursue a given procurement route to achieve a future project, is likely to be strongly influenced by these factors. Therefore it is clear that the traditional measures of performance of a construction projects are not sufficient to assess their 'true' performance.
It can be argued that the methods used to measure performance in construction projects fall into the three main categories of the BSC.

1. **Financial perspectives:** how do the project's financial stakeholders view the project?
   For example, use of each cash flow forecasting and cost benefit analysis.

2. **The internal business process perspective:** how are managers performing in the key process activities? For example, use of critical path analysis.

3. **The customer perspective:** how do the existing and potential customers see it?
   In 1990 there have been some 'emerging' techniques and philosophies to measure and manage performance, such as total quality management (TQM), benchmarking, business process re-engineering (BPR) and business process management that have shifted the focus from 'lagging' towards 'leading' indicators of performance. The majority of these concepts have been imported into construction from manufacturing industries; see e.g. Koskela (1992), Mohammed (1995), Kagioglou et al. (1998). Furthermore, these measures have tended to concentrate on construction productivity and factors that influence it (Motwani et al., 1995), with the aim being to achieve continuous improvement. Therefore, the fourth perspective of the balanced scorecard (BSC) is also emerging in the 'organizational learning' indicator. However, this can be problematic since participants in construction projects are 'joined' temporarily until the completion of the project, where the aim is to find method for measuring and managing performance that can be consistently applied to sets of project participants; these methods are likely to involve an integration of the 'traditional' and 'emerging' techniques.

Recently the UK best practice programme (cbpp) launched the 'key performance indicators' (KPIs) for construction (Bprc, 1999). These KPIs give information on the range of performance being achieved on all construction activities, and they include the following:

1. Client satisfaction- product
2. Client satisfaction- service
3. Defects
4. Predictability-cost
5. Predictability- times
6. Profitability
7. Productivity
8. Safety
9. Construction cost
10. Construction time

These KPIs are intended for use as benchmarking indicators for the whole industry, whereby an organization can benchmark itself against the national performance of the industry and identify areas for improvement, i.e. where they perform badly. Clearly these measures are specific to projects and offer very little indication as to the performance of the organizations themselves from a business point of view, apart perhaps from the 'customer perspective' of the BSC.

8.7 Conclusion

Sustained organizational success can only be achieved through people. A model evolving a number of techniques and examples must be provided to illustrate how successful firms can think strategically about human resources to accomplish their strategic and operational goals. Unfortunately, few firms in the construction industry use Human Resource management (HRM) as a source of competitive advantage. Instead, most rely on financial or technological acumen and scientific management techniques which place ever-greater expectations on their employees' goodwill and stamina, and take for granted their commitment and skills in being able to rise to any challenge presented. However, considerable evidence is accumulating that this approach is unable to produce the productivity improvements the industry's clients are demanding.

In regarding of the future of the HRM in construction, it is possible to draw a number of conclusions. Most importantly, there must be a greater emphasis on HRM as a key enabler of organizational objectives. Training and development are the two basic components of HRD. A reason for the acceptance of training as a core component of HRM-related to concepts and the need to impart the requisite skills, knowledge, attitudes, and abilities to employees. Training should go hand-in-hand with wider HRD activities if it is to be effective in delivering better performance. The object of training is to alter the behaviour of employees in a way that will create improvements in the achievement of organizational goals. It should provide opportunities for employee to learn job-related skills, change attitudes and help people to acquire knowledge. It is important to note that training should be viewed as a means to an end and not an end in itself right. An organization that invests in HRD will derive organizational performance benefits only to the extent that it facilitates learning and the development of teamwork and knowledge (Holton, 1996).
Training and development are key aspects of the HRM function, but are often overlooked as a mechanistic activity within many organizations. This is dangerous, since it grossly oversimplifies one of an organization's primary routes to competitive advantage. By defining the competency and developments requirements of the individual employee in a team context and targeting the achievement of these competencies through training, construction organizations can ensure that their employees have the requisite skills to cope with a dynamic industrial environment. The ultimate goal for organizations should be to develop into learning organizations that have the capacity continually to develop in response to their business environment.

8.8 The Main Variables of End Result: Performance Improvement as Conclusion

The study has been given an increasing interest in examining the links between Managerial Activities (variable 1.1) and System Performance (variable 9.1), considering the link in a construction context and argued that there is an absolute necessity to place HRM (Human Resource Management) issues at the center of decision-making. As Huczynski and Buchanan (2001:673) argued that: "A managerial perspective, with theoretical and perspective dimensions, which argues for the need to establish an integrated series of personnel policies consistent with organization strategy, thus ensuring quality of working life, high commitment and performance from employees, and organizational effectiveness and competitive advantage." Also, Marchington and Wilkinson (2000) argue that while human resource considerations should reflect business strategy, business strategy should also reflect human resource considerations. Competitive advantage is crucial to the growth and prosperity of any business, and involves the achievement of an advantageous market position to enable the consolidation and expansion of market share in relation to competitors. In order to sustain a competitive advantage any organization must commit itself to improvement, innovation and change (Porter, 1990).

The function of Human Resource Management (HRM) as dependent variable (variable 3.1) is considered a core Managerial Activities as a independent variable (variable 1.1), rather than a specialist support function, and is considered good practice for anyone with managerial responsibility to be involved with employee management issues (Cornelius, 2001).

Herbsman and Ellis (1990) have attempted to classify systematically the factors that affect the construction productivity. They refer to these as Construction Influence Factors (CPIFs), which are essentially divided into main categories: technological and
administrative factors (Kane, 1980). Technological factors are related to issues concerned with the design of the project. While administrative factors pertain to the management and construction of the project, which include construction methods and procedures, equipment factors, and labour and social factors such as the compensation/reward system, skills training methods, management-employee relations and employee-supervisor relations. Therefore, the seven organization subsystem: the Organization of Training and Selection Subsystem (variable 1.1), the Organization of Motivational Subsystem (variable 1.2), the Organization of Environmental Subsystem (variable 2.3) the Organization of Structural Subsystem (variable 2.4), the Organization of Project Information (variable 2.5), the Organization of Capital Subsystem (variable 2.6) and the Organization of Resources Composition Subsystem (variable 2.7) as primary variables will cause an effect on Human Resource Management (HRM) as dependent variable (variable 3.1). Also, Turin (1969) argued that human resources, materials, plants, and tools are the major factors of production. A manager is a person in an organization who is responsible for the work performance of one or more other persons.

The Organization of Training and Selection Subsystem (variable 1.1), the Organization of Motivational Subsystem (variable 1.2), the Organization of Environmental Subsystem (variable 2.3) and the Organization of Structural Subsystem (variable 2.4), the Organization of Project Information (variable 2.5), the Organization of Capital Subsystem (variable 2.6) and the Organization of Resources Composition Subsystem (variable 2.7) as primary variables will cause an affect on Human Resource Planning (variable 4.1), Resource Effectiveness & Efficiency (variable 4.2), Motivation Technique (variable 4.3), Job design & Characteristic (variable 4.4), Working Condition (variable 4.5), Health and safety (variable 4.6), Working Environment (variable 4.7), Working-life Balance (variable 4.8), and Human Resource Information (variable 4.9) as intervening variables. Armstrong (1996) argued that: ‘the personal function should contribute to organizational effectiveness by adding value to its products and services and by contributing to competitive advantage.’

Human Resource Planning (variable 4.1) is the main function of the Human Resource Management (variable 3.1). Recruitment (variable 5.1), Selection (variable 5.2), and Training and Development (variable 5.3) are the main basic functions and components of HRP (Human Resource Planning (variable 4.1)). As Mike Walter (1998) specified that, according to one company executive of Thomas Telford U.K.: ‘Construction Company it is important to take the training of its workers more to meet higher quality of services required by client.’
The object of *Training and Development* (variable 5.3) is to alter the behaviour of employees in a way that will create improvements in the achievement of organizational goals. It provide opportunities for an employee to learn opportunities for an employee to learn job-related *Skills* (variable 6.1), help people to acquire *Knowledge* (variable 6.2), and changes in individual *Ability* (variable 6.3) and changes *Attitudes* (variable 6.4). Encouraging employees to work in a way which leads to better-quality products and therefore a more positive organizational images demands that they are trained and developed in a way which strives to achieve quality improvements.

In accordance changes in these four variables, *Skill* (variable 6.1), *Knowledge* (variable 6.2), individual *Ability* (variable 6.3) and *Attitudes* (variable 6.4), will cause changes in the following end result intervening variables:

a) *Highly motivated and satisfied worker*, variable 7.1, as Strauss *et al.*, (1960), (ed. Shaddad 1983) argued that: “..motivates employees to work hard…”

b) *Competence worker*, variable 7.2, as ILO’s report, 1998 stated that: “.retains a job, improves their productivity at work, and their income earning…”

c) *Healthy and safety worker*, variable 7.3, as Levitt *et al.*, 1976 (ed. Shaddad, 1983) argued that: “..reduces accidents, increase output,”

d) *Low absenteeism and turnover*, variable 7.4, as Pigores *et al.*, 1969, (ed. Shaddad, 1983) argued that: “..Dissatisfaction, complaints, absenteeism and turnover can be reduced…”

e) *Continuity of production*, variable 7.5, as King *et al.*, 1964, (ed. Shaddad, 1983) argued that: “..reduces learning (cycle) time; this is almost the traditional result of improved training methods,

f) *Cost control and project effectiveness*, variable 7.6, as Glueck, 1974, (ed. Shaddad, 1983)”Training can reduce waste, and increases output…”

g) *High quality of production*, variable 7.7, as De Simon, 1966, (ed. Shaddad, 1983) argued that: “Better quality is often quoted as a benefit of improved training method…” and

h) *Machine utilization*, variable 7.8 as Shaddad (1983) argued: “improving the ability of an operator can affect machine utilization”

Consequently these changes will affect the end result *Efficiency* variable 8.1, *Effectiveness* variable 8.2, and *Competence* variable 8.3, and the end result variable which is *System Performance*, variable 9.1. Ward *et al.* (1991) described how and when assessing the success/failure of construction projects, 'a common approach is to evaluate performance on the extent to which client objectives like cost, time and quality were achieved'. The 'three traditional indicators of performance' (Mohsini and Daviudson, 1992) were used in U.K. construction industry. Finally, Martin *et al.*, 2003 stated that: “.. where those industries which invest in training tend to perform better and have a more positive public image than those which do not.”
The general and task *Environmental Subsystem*, (variable 2.3), will influence every variable in the system.
Chapter 9: The Design of the Model

9.1  Introduction
9.2  The Order of the Variable in the Design Model
9.3  Integration of the Model
9.4  Conclusion
CHAPTER 9

THE DESIGN OF THE MODEL

9.1 Introduction

In order to achieve a high performance, the organization must satisfy, create, and design an effective, efficient, and competent workforce. The study to achieve such goals, a basic tool for constructing the model is system approaches. Included here are models that emphasize the organization as a system, and attempt to assess the effectiveness of the system in terms of its input, transformation, and output. The system approaches models included the resource model which views performance variables as the ability of the organization as a system to exploit its environments, the internal process model where effectiveness is judged by the efficiency of the process inside the system, the strategic adoption model which recognizes and judges effectiveness by the degree of adaptability to external forces, and the open system model which views the organization as an open system. Effectiveness here is indicated by the ability to meet internal and external challenges.

To have a comprehensive understanding of organizational performance, firstly, the key variables in the domain of performance must be identify and then the relationship of these variables to performance must be determined. Such an approach would provide a reliable method of predicating the level of effectiveness, efficiency, and competence. The types of variables or criteria that can be used vary by domain and level of analysis. Finally, the competing values were chosen as a valid configurational approach on which to identify criteria of performance for the developed method.

This chapter will be concerned with integrating the main subsystem and variables (major subsystems, variables and boundary of the model has been considered from chapter 2 to 7) into comprehensive system causal model.

9.2 The Order of the Variables in the Design Model

The system approaches model used in this study, emphasizes the organization as a system and attempt to assess the high performance of the job in terms of its input, transformation, and output. So, all systems and their models can be considered as in a hierarchical sense. It is composed of subsystems of a lower order and is also part of subsystem. Thus, there is a hierarchy of the components of the system. The study
identified seven subsystems as are important determinates of the optimum level of system performance in the construction industry, the nature of these subsystems and their variables imbues the hierarchical sense of ordering, as suggested in Fig. 9.

Analysis of a construction firm’s characteristics that pertain to structural context, focus and strategy (means and ends) along the dimensions of effectiveness by values of the models, helped to identify the important variables included in the methodology. A construction firm that pursues strategic flexibility must have a structure that is better suited for contractual arrangements that provide flexibility such as subcontracting, joint venturing, partnering and alliances. Although pursuing these contractual arrangements may provide cost-effectiveness, they limit the degree of control the organization has over its processes. In its quest for the flexibility of services offered, a construction firm may be integrated vertically upwards by offering financing and Architecture/Engineering (A/E) design and material supply services or downwards by offering maintenance services in an effort to exercise a greater degree of control over the quality of the construction product and increase its market share. However, according to Krippaehne et al. (1992), a construction organization with integrated services will develop defensive, strategies and rigidity to compensate for increase in risks and potential increases in fixed costs.

The construction firm’s style of management of its workers, its criteria of success and the type and strength of culture that exists in the firm influence its organization focus. Internally-focused construction firms that value flexibility in the assessment of effectiveness should be more sensitive to their workers. They may achieve this by allowing a high degree of participating in decision making through a strong culture of team-work. Internally-focused construction firms that value control in the assessment of effectiveness should stress adequate communication and information management through a strong culture of hierarchy with clear rules and regulation for performance.

Externally-focused construction firms which value flexibility in the assessment of effectiveness should emphasize adaptability through a strong culture that promotes readiness and innovations. Externally-focused firms which value control in the assessment of effectiveness should emphasize planning, goal setting, and a strong culture that promotes productivity and accomplishment.

At this level (level one, the managerial strategies), all the managerial strategies and the potential policies for efficient utilization of resources, and hence a high rate of system performance should start at this level. At this level, the various design configurations to optimize the clients’ needs, the various project systems, and their interface requirements
and practices, such as construction methods, materials, labour, technological innovation etc. will be decided upon. Then the preliminary and the final design will be made with the preparation of the overall project planning and cost estimation. The lack of regard for the performance of the construction industry in most countries may have been a victim of a failure at this level.

There was an overall agreement regarding the factors that can affect performance on a construction site (level four). They identified ‘ineffective project planning’ as the most crucial factor likely to impair construction productivity. This finding supported the notion (Borcherding and Ganer, 1981) that:

The planning/design level is probably the key communication link in the hierarchy model between the ‘realities’ of the site construction level and the ‘abstract’ of the policy and programme management levels. The planning/design level becomes the controlling element in the industry’s effort to translate productivity information from above into a common language with a terminology meaningful to the desired audience.

At this level (level two, the planning and design level), the fragmented nature of the construction industry where design is separated from construction, places great dependence on the competence of the building team as setting up the building process and bringing the work to a successful completion. Many earlier reporters, and researchers conducted in the 1960s and 1970s (such as the Emmerson, 1974 and the Banwell, 1964 reports), stated that there is a lack of liaison between the architects and other professionals and contractors, and between them and clients. It has continuously been argued that no other important industry is the responsibility for the design so far removed from the responsibility for the production. These reports emphasized the need to reform the organizational approach to building projects. Building project management, level three, was seen to be a passive procedural activity, but the movement towards a more dynamic integrated approach was later suggested by Higgins and Jessop (1985). They went further and noted that:

If building is though of without the people involved, it can be seen as a chain of interdependent operations called the Technical System, i.e. briefing, design, estimating, billing, supplying, etc. To undertake these operations, a wide variety of resources, e.g. material and skill, remain the control of people and organizations which are called the resource controllers (i.e. The Social System).

The central problem arises from the fact that the basic relationship which exists among ‘resource controllers’ has the character of interdependence of the resources and the organizational independence of those who control them. Any attempt to reorder the division of responsibilities among resource controllers that might arise from a
purely technical study would run up against deep-seated difficulties of professionals, technical and commercial interests conflicting values and vested

With the increasing need to exploit new methods of construction, and to design for increased industrialization, mechanization, specialization, and economies of scale, it is necessary to develop a way to orient construction methods. This will undoubtedly require major changes in the traditional relationships between those involved with the design and those concerned with construction. The NEDO report (1983) Construction for industrial Recovery, commenting on management in the construction industry and the need for effective project management, suggest that one participant from the industry should take the full responsibility for the project. This will ensure full integration, co-ordination and control from the feasibility stage to the commission stage. Also, traditional competitive tendering is criticized by professionals as being unable, in a situation of certainty about all factors affecting time and cost, to provide the basis for a valid and protective contract.

There are two main types of attacks on the problem of the unsatisfactory nature of the organization, functioning and communications in the building industry. First, exhortations to return to the formal system in its pure form, i.e. directive functions which were deplored. Second, a call for some new form of system to incorporate the more adaptive characteristics of the informal system.

Thus, the socio-technical analysis and the three dimensions described by the Tavistock Institute (1965,1966) of complexity, uncertainty, and interdependency had a great impact on the introduction of alternative forms of team building process (such as package deals in the late 1960s and management contracting by the early 1970s). Also, the element of integration and its relation to team building must be considered. Principally, the changing technologies, procedures, materials, and complexity of building process are such that the sequential approach of independent professionals to the formation of design and construction solutions is unable to provide an efficient solution to the client’s requirements.

The notion of integration of the building team, at level four, has been reported in a number of studies, such as the Banwell (1964), the Sidwell (1982), Naoum (1989), Latham (1994) and the Egan report (1998). Evidentially, high integration among the members of the building team can help to improve the performance of the project. It is also important that each team and sub-team should be composed of people with various characteristics. The most important role in the team building is the leader.

A study on construction times for industrial building by NEDO (1983) concluded that:
"It is not the form of contract which primarily determines whether targets are met but the attitude of the parties to which the form of contract may contribute. The standard form of contract offers penalties for delays but not incentives for speed. Industry and customers should look for ways of sharing the benefits from improved performance”.

Turner (1986), referred to the benefit of high integration of a harmonious team. He stated:

"By breaking down the ‘use and them’ syndrome, the professionals and the management contractors are able to pool together their once fragmented expertise for the benefit of the project. Thus, the participants in the construction industry can work together as a team rather than being excessively concerned with their own individual roles, vice versa other participants”.

The main objective of the study lays within levels three and four although that management lies at that levels cannot be taken in isolation from levels one and two. Decisions at level one must be taken not only in the context of relationship pertaining to its own logic, but with the awareness of the limitations are likely to experienced at levels 2, 3 and 4.

9.3 Integration of the Model

As mentioned above, the system view of organizations and their management serve as the basic conceptual framework for this study. The key concept of organization systems is that the whole organization is composed of a set of independent but interacting subsystem, and these subsystems are in continuous interaction with the external environment. The dominant feature of a system is that it has a goal and objective. The main objective of the project management system in the construction industry, which is considered by the study, is the performance of the project i.e. cost, quality, safety, and time. The study identified seven managerial subsystems which have been defined as a description of the activities of the project management to achieve high performance of the project. According to the study, these subsystems do not have to be operationally dependent or even interact, but the failure of any subsystem can be threatened and hence the other parts. Cleland and King (1983) provided the following definition of the system approach:

"A system approach by its very nature is made up of interdependent elements, as such actions which affect one element must affect other also, and actions of one element cause reactions on the part of others. The recognition of such interactions and interdependencies both within the and without the organization is the essence of the system theory".
The subsystem of the model, which is the subsystem of project management, will have a primary task through which they themselves survive which will be the contribution to the goal and objective of the system i.e. the system performance of the project. A systematic listing of all the important concepts and variables, extracting from a careful reading of literature, enables the construction of a casual model to each of the seven subsystems. For the purpose of the study, it will concentrate on the major subsystem which is the Human Resource Development subsystem. It has been considered as a priority and essential subsystem. Naturally, no one research can cover all of these subsystems, but the studies review the other six subsystems. A common primary casual variable, Managerial Activities, variable 1.1, and a common end-result variable, System Performance, variable 9.1, and a standard format of modeling illustrated in Fig. 31, grouping the variables into the following:

(a) Independent variable (inputs). This is the component or sub-system that does the causing and which, when varied, appears to induce change in another variable (or sub-system). In the model constructed in this study the independent variable represented by Managerial Activities variable (0), primary independent variable, (1) and secondary independent variable (2).

(b) Intervening/moderating variable (process). This is the transformation or conversion process that explains the linkage between the dependent and independent variables, and causes the relationship between them to change. In the model constructed in this study is represented by first group of intervening (3), second group of intervening (4), third group of intervening (5), fourth group of intervening (6), fourth group of intervening i.e. Efficiency, Effectiveness and Competence (7).

(c) Dependent variable (output), this component or subsystem which is acted upon or caused by the independent variables. In the model constructed in this study the dependent variable represented by the System performance of the job, variable 9.1

The model which is composed of variables incorporating all the major project managerial variables which have a direct or indirect casual effect on system performance of a construction project. The boxes in the model represent the endogenous dependent variables, with lines and arrows indicating the casual patterns and the alleged casual direction with a plus or minus sign representing positive and negative relationships. Also a number of arrows to some variable means that some variables in the model not relate just to one. The time factor is explicitly included in the model by the arrows shown. These arrows indicate that changes in the variable from which they emerge will cause changes in
the variables in which they enter after a passage of time. The straight line connecting the all the variables is an indication that the linear additive nature of the relationships between each pair of variables.

9.4 Conclusions

The following are the conclusions arising from the model:

a) Construction project operates with a complex dynamic environmental and affected by both external and internal forces. So, it is performed in a complex open system. For this reason, it is useful to examine the context of the system with the help of the system theory. Therefore, a schematic causal model of system and its variables has been developed as shown in Fig. 31.

b) The value of systems theory to the study of construction organizations is its ability to simplify complex situations by considering its subcomponents (subsystems). However, this is not done in isolation, and systems theory is particularly concerned with the relationships and interdependencies between these subsystems. The model illustrates that managerial system spans job activities in the construction project; it determines the overall objectives and relates the subsystem tasks to the overall task of the project.

c) The system approach involves the study of the relationship between interdependent technical and social variables; changes in the technical system will impact on the social system and vice versa. From this the idea of the socio-technical system was developed, and it can be seen to have clear relevance to the construction sector where technological advances could bring about changes in the integration of groups and the sociological properties of working methods. While systems theory provided new insights into these issues, Miles (1967) warned that its strength, within its ability to simplify complex situations, is also its primary weakness. He argued that the simplicity of such models can create a blinkered approach which underplays the way that human emotions, needs, aspirations and behaviors reverberate through the patterns of work.

d) Sustained organizational success can only be achieved through people. The study has provided a number of techniques and examples to illustrate how successful firms can think strategically about human resources to accomplish their strategic and operational goals (system performance of the jobs and the project as a whole).

e) Therefore, the model emphasizes that the seven managerial activities or subsystem determines or strongly influences the Human Resource Management which in turn influences intervening casual variables. The chain of relationships continues through to
the end-result intervening variables, end-result efficiency, effectiveness and competence variables, and result variables which are system performance.

f) The model as an open system takes inputs/resources from its environment, transforms them in some way and then sends back to that environment. The variables included in this model, and their effects upon one another are not new to most researchers of performance in the construction industry; most of the elements of this model are supported in the literature.

The comprehensive model illustrated in this study is the combination of such a large number into a system of causal inter-related variables enough to be useful, yet simple enough to be comprehensive.
Effective managerial activities

Variable 1.1 Org. of structural subsystem variable 2.4
Variable 2.4 Org. of environmental subsystem variable 2.3
Variable 2.3 Org. of motivational subsystem variable 2.2
Variable 2.2 Org. of training & selection subsystem variable 2.1
Variable 2.1 Org. of information subsystem variable 2.7
Variable 2.7 Org. of capital subsystem variable 2.6
Variable 2.6 Org. of resource composition subsystem variable 2.7

Human resource management variable 3.1

Human resource planning variable 4.1
Resource effectiveness efficiency variable 4.2
Motivation technique variable 4.3
Job design & characteristic variable 4.4
Working condition variable 4.5
Health & safety variable 4.6
Working environment variable 4.7
Working life-balance variable 4.8
Human resources information variable 4.9

Recruitment variable 5.1
Selection variable 5.2
Training & development variable 5.3

Skill variable 6.1
Knowledge variable 6.2
Ability variable 6.3
Attitude variable 6.4

High motivated & satisfied worker variable 7.1
Competence worker variable 7.2
Healthy & safety worker variable 7.3
Low absenteeism disinterested worker variable 7.4
Continuity of production variable 7.5
Cost control & effectiveness variable 7.6
High quality production variable 7.7
Machine utilization variable 7.8

Efficiency variable 8.1
Effectiveness variable 8.2
Competence variable 8.3

Job performance variable (time, cost, quality & safety) variable 9.1

Fig 31 Integrating the Causal Model of the Seven Managerial Subsystem into one Conceptual System Causal Research Model
Chapter 10: Testing the Conceptual Causal Model

10.1 Introduction
10.2 Data and Procedures
10.3 The Sample Population
10.4 Non-Parametric Method
CHAPTER 10

TESTING THE CONCEPTUAL CASUAL MODEL

10.1 Introduction

Researchers have offered a variety of models for examining organizational performance, yet there is a little consensus as to what constitutes a valid set of criteria for measurement. In today’s environment, it is suitable for construction firms, aiming to maintain and improve performance, to utilize any appropriate method to predict their organizational effectiveness.

This study illustrates a methodology for predicating the level of organizational effectiveness, efficiency, and competence i.e. the organizational performance at a project level. Sixty four variables are placed in a conceptual system of a causal research model representing managerial factors assumed to affect system performance at a project level in the construction industry.

This chapter deals with the framing of the subjective surveys, then testing reliability, and validity of the data collected by the surveys, the data analysis and the construction of the path analysis of the conceptual system of the casual research model.

10.2 Data and Procedures

Since all the identified variables are not directly observable through hard quantitative measures, questionnaires were designed to measure manager’s perception of variables characteristics, aspects, and magnitudes in construction firms. A field study was conducted to collect the relevant data.

In general, there are three methods for collecting survey questionnaires data: (1) personnel face to face interview, (2) self-administrated questionnaires, and (3) telephone interview. Self-administrated, are usually mailed to respondents, but they may also be dropped and picked up later, or they may be given to a group all at once. Each of these data-collection methods has its advantages and disadvantages. As there is no concluding evidence that one method of administrating questionnaires is better overall than the others.

So for the sake of this study, a survey based on interviews was ruled out because high cost would limit the geographical scope of the research. Telephone interviews was, also, ruled out due to the difficulty of the question. A self-administrated questionnaire was,
therefore, the available method. Drop-and-collect technique was used with some informants and self-administrated questionnaires were used for the rest. The technique allowed relative by low cost per datum to be achieved.

A closed-ended formal questionnaire was designed, since it is more effective than open-ended questionnaire. It provided a uniform framework of references for answers and it was inexpensive to work with the data which emerged from it. However, care was taken in defining possible answers so that:
1) bias was reduced,
2) all possible opinions were accounted,
3) none of the answer categories coincided.

The questionnaire was used to solicit responses from the upper managerial level personnel (at the site level). It is notable that the employment of a subjective measure of sixty four variables included in the causal research model developed for this study is difficult and impracticable task, compared to other tools utilised in similar tasks, for instance, Porter's (1981) questionnaire, for measurement of the level of satisfaction was composed of fifteen items. That means with the sixty four variables included in the model, it would be necessary for the study to present a questionnaire composed of more than a thousand items. Dillman (1978) insist on the limiting number of the questionnaire questions. He suggests that questionnaire not to exceed 125 questions, beyond that, response rate would drop significantly.

However, if the link between the theoretical variables is direct and completely specifiable, as in the case of the casual model of this study, then a model may be tested by subjective weighting of each link to assess the strength of the causality. For each variable, a different number of items (statements) were used in the measurement scale to which the respondents rate the attributes of the variable under question. Ratio scale measurements and rank judgment, combined with question seeking priority amongst particular variable were employed to combine factors linked to a variable.

Writing a good questionnaire is an art, and there are some well-understood rules that must be followed. The following points are used as a guiding principle when designing the questionnaire of this study, these are:
1) Questions should be direct and obvious to respondents,
2) Vocabulary used in questions must be understand by respondents,
3) Questions must be planned, so that respondent are not frustrated confused or annoyed,
4) Effort should be made that question should convey a definite meaning to all respondents, so that all respondents should not get different meaning from the same statement,
5) Keep unthreatening question short, it should contain as few words as possible and up to the point,
6) opinion questions should specify the reference situation as much as possible,
7) To ‘package’ question in the questionnaire, so that to get a lot of data quickly and easily, also, to prevent respondent getting bored with the surveys;
8) Questions to be sequenced in such a way as to motivate respondents to record their responses spontaneously and without much thought,
9) Questions should include negative as well as positive statement in order to check a possibility of false statement among the respondent described.

The final questionnaire developed for this study, which is printed in 25 pages, is given in Appendix 1. It consists mainly of two parts, A and B and of ninety-six questions. Part A of the questionnaire was designed to obtain personal data of the respondents. They were asked to furnish information about the type of work they had been organizing recently, scope of work, experience, numbers of employees in the company, and the fixed assets of the company. Part B, which is the main part, is concerned with the opinion of the project managers on the different hypothesis and casual links included in the causal research model system. All the questions in Part B are designed in the format described above. This part is divided into sections, each concerned with a managerial factors that affect the performance of a project reward and motivation systems, attitude and behaviour effectiveness, and performance of the project can be improved by developing the training, selection and development of the workforce.

For the purpose of this research, a simple form of an opinion questions is design, to read a statement and ask the respondent to agree and disagree. Simple agreement and disagreement statement, however, gives no clue as to the intensity of a respondent’s view. Intensity can best be measured if a stronger agreement or disagreement is included in a scale. Since, however, Miller (1956) argued that people can make up to seven distinctions reliably. In this study, project managers were asked to express their opinion along a five-point scale which varied from +2 to -2 as shown below.

<table>
<thead>
<tr>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>DA</th>
<th>SDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
<td>0.0</td>
<td>-1</td>
<td>-2</td>
</tr>
</tbody>
</table>
+2 means Strongly Agree
+1 means Agree
0.0 means Undecided or Uncertain
-1 means Disagree
-2 means Strongly Disagree

When the statements were framed to respondent negative views, they were scored the other way round. Such a scale is, no doubt, a crude measurement, but taking into account recent developments and the refinement of statistics and computation, it is possible to handle and analyse, more objectively, subjective data that emerge from such survey.

10.3 The Sample Population

Samples are used to estimate the true values, or parameters, of statistics in a population, and to do so with a calculable probability error. The word population is used to denote the aggregate from which the sample is chosen. Researcher (1989) urged that a study based on a representative sample of adequate size, is often better than one based on a larger sample or on the whole population. That is, sample data may have greater internal validity than data from the whole population. For this study, the application of system theory, and thus the model of this study are particularly relevant to large construction projects where, normally, projects managers at the site level enjoy a considerable degree of autonomy enough for a project to be identified as a system in its own right, hence a request population of managers of large construction firms from whom information was sought.

According to Bernard (1988) there are seven major kinds of sampling. Three of them- simple random, stratified random, and cluster samples-are based on the principles of probability theory. The other four-quota, purposive, snowball, and haphazard samples- are not. Probability sampling; samples in this group may be drawn according to some methods consistent with probability structure, just long as the probability of occurrence of any particular sample is known or can be calculated. The probabilities are then taken into account in the treatment of any information gained from the sample. Non-probability sampling; the sample is restricted to a part of the population that is readily accessible, the sample, also, consists essentially of volunteers. With small but heterogeneous population, the sample will inspect the whole of it and selects a small sample of typical units-that is,
units that are close to his impression of average of the population. Lastly, the sample selected haphazardly, that is mean selection without planning.

The sampling procedure which was used in this study belongs to the second group, the non-probability sampling. The sample was restricted to a part of the population of the managers of the large construction projects that is readily accessible and, moreover, due to the nature and length of the questionnaire only some volunteers were expected to respond.

Non-probability sampling, however, is not amenable to the development of a sampling theory that is model-free, since no element of random selection is involved. The only way of examination how good one of these may be is to find a situation in which the results are known, and make comparisons. Even if a method appears to do well in one such comparison, this does not guarantee that it will do well under different circumstances.

A total of 65 questionnaires were dropped during February 2005, to the accessible project managers and company directors, in the Greater Khartoum. Appendix 2 gives a list of construction and consultant companies in the Greater Khartoum. Names and addresses of managers and companies were obtained from a number of sources, the principal being:

a) The registration list of Sudanese Contractors Associations (SCA), it contains about 450 companies working in the field of construction;

b) The registration list of The Organizing Council For Consultancy Firms (OCCF), it contains about 25 consulting companies;

c) Other well known companies still not listed in the above unions.

Enclosed with each questionnaire was a covering letter explaining the main objective of the study.

Out of 65 questionnaires, thirty or slightly more than 47% were returned positively completed less than 7% apologised, two were excluded for a variety of reasons, including inadequate completion of the survey instrument and the rest didn’t respond. This response may be considered more than satisfactory when the nature and length of the questionnaire taken into account. Following the recommendations of the Council of American Survey Research Organizations (CASRO, 1982), response rates were calculated in a manner which removed ineligible responses from the sample size. This calculation resulted in a return rate of 47%. The majority of the respondents were manager of contracting companies, the average of company experience were less than 5 years 10%, 6-10 years 26.7%, 11-20 years 3.3% , and more than 21 years 26.7%. The average of the company
fixed assets were less than $25,000 16.7%, $26,000-50,000 16.7%, $51,000-100,000 13.3%, and more than $100,000 53.3%.

The entire positively completed questionnaires were used in the compilation of the results. Data from the survey were analysed for significant bivariate associations using the chi-squared goodness-of-fit test, cross tabulation and path analysis.

The statistics tests used in the study were:

a) Pearson chi-square test,

b) Pearson’s R correlation coefficient,

c) Kendall’s coefficient of concordance, and

d) Path analysis.

In the next section, a simple description of how the statistics test used to analyse the data from the questionnaire.

10.4 Non-parametric Method

The terms ‘distribution-free’ and ‘nonparametric’ are sometimes regarded as synonymous. Indeed, in defining a distribution-free method Marriot (1990) states that ‘Distribution-free inference or distribution-free tests are sometimes known as nonparametric but this usage is confusing and should be avoided’. Many tests that are generally regarded as nonparametric or distribution-free involve parameters and distributions. This is because the tags ‘nonparametric’ or ‘distribution-free’ relate not to the distribution of the test statistics, but to the fact that the methods can be applied to samples from populations having distributions which need only be specified in broad terms, e.g. as being continuous, symmetric, identical, differing only in median or mean, etc. nonparametric methods are not assumption-free. Software that rapidly computes exact \( \rho \) -values for permutation tests for small to medium-sized samples and that provides accurate estimates of trial probabilities by simulation for larger samples has revolutionized application of nonparametric methods. There are specialized programs dealing with particular aspects of the broad fields of nonparametric and semi-parametric inference. Popular general statistics packages such as Sata, Minitab and the standard versions of SPSS, SAS, etc., include some nonparametric procedures.

Some statistics used for nonparametric tests have, at least approximately, familiar continuous distributions such as normal, t, F or chi-squared distribution. The followings are the test used in the study:
a) The Pearson chi-squared test: is a statistical for testing independence of row and column categories. Its appeal is:
- Ease for computation.
- Fairly rapid convergence to the chi-squared distribution as count size increases.
- Intuitive reasonableness.

An exact test is based on the permutation distribution of this statistics over all samples configurations having the fixed marginal totals computation of ρ-values is no easier than it is for the Fisher exact test and only 2×2 tables are the exact tests often equivalent. Pearson (1900) proposed the statistics:

\[ X^2 = \sum_{ij} \left[ (m_{ij} - n_{ij})^2 / m_{ij} \right] \]  

(10.1)

as a test for evidence of association.

For computational purposes it is easier to use the equivalent form:

\[ X^2 = \sum_{ij} (n_{ij} / m_{ij} - 1) \]  

(10.2)

b) Pearson’s R Correlation Coefficient: estimates the degree of linear association between two variables. The coefficient takes value between -1 and +1; these extreme values are attained only when points lie exactly on a straight line (with negative slopes or gradients respectively). The sample Pearson product moment correlation coefficient, \( r \), is defined as:

\[ r = \frac{\sum [(x_i - \bar{x})(y_i - \bar{y})]}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}} \]  

(10.3)

Which for computational purposes is usually rearranged and written:

\[ r = c_{xy} \sqrt{\frac{c_{xx} c_{yy}}{n}} \]  

(10.4)

where

\[ c_{xy} = \sum (x_i y_i) - \left( \sum x_i \right) \left( \sum y_i \right) / n, \quad c_{xx} = \sum x_i^2 - \left( \sum x_i \right)^2 / n, \]

\[ c_{yy} = \sum y_i^2 - \left( \sum y_i \right)^2 / n \]  

(10.5)

In parametric inference the Pearson coefficient is particular relevant to a bivariate normal distribution where the sample coefficient \( r \) is an appropriate estimate of the
population correlation coefficient $\rho$. If $\rho = 0$ for a bivariate normal distribution this implies $X$ and $Y$ are independent and values of $r$ close to zero support that hypothesis. In contrast, basic nonparametric correlation inference does not require the assumption of bivariate normality and can be applied to both paired observations of continuous data and to data consisting of ranks. These ranks may be original data or they may be derived from continuous measurement.

c) Kendall coefficient of concordance: Kendall regarded his coefficient as an extension of the concept of correlation to more the two sets of ranking. Whereas in the bivariate case it may use the Kendall correlation coefficient to measure both agreement (positive association) and disagreement (negative association), concordance, whether measured by Kendall’s original statistics or the Friedman modification, is one-sided in the sense that rejection of the null hypothesis indicates positive association. Kendall proposed the statistics

$$W = \frac{S}{\text{Max.}(S)} \quad \text{(10.6)}$$

which he called coefficient of concordance. Kendall’s coefficient of concordance is based on the sum of squares of deviations of the judges’ rank sums from their mean or expectation.

d) Path analysis: this form of analysis involves the use of multiple regression equations to construct a path model of associations. Szymanski et al. (1993) argued that path analysis is provides a clearer understanding of the associations than the use of regression alone. Indeed, Szymanski et al. contend that the advantages of the path methodology over that of simple regression stems from the ability of the techniques to ‘provide insight into the magnitude of direct effects’, ‘indirect effects’ (i.e. the effect of a predictor on the criterion variable through an intervening variable) and ‘the effect of coefficients (i.e. the total effect equal to the direct plus indirect effects)’ (1993, 8). Consequently, Szymanski et al., (1993, 8) conclude that: ‘a path methodology enables the examination of ‘whether an indirect effect embellishes, diminishes or negates an associated direct effect’.

Thus, the form of path analysis used enables the examination of indirect as well as direct associations, thus providing a clearer understanding of relationships (Blalock, 1972; Duncan, 1966).
By the construction of the conceptual schematic causal diagram of Fig. 32, the first requirement in path analysis, the existence of a clear model which indicates the nature and direction of relationship among variables, is met.

The second requirement for the employment of path analysis is the assessment of the absence of severe multicollinearity in the model. Multicollinearity refers to a very high inter-correlation among the independent variables. This study, however, in the interests of simplicity, has no attempted to determine the relationships between each category of variables and some of the variables are treated as exogenous only to help the estimation of the parameters of dependent variables. The third stage is the development of path analysis equations. The conceptual causal diagram of Fig. 30, in conjunction with a few rules, allows the expression of the value of a dependent variable in terms of the value of its source variables. The rules (Heise, 1970) are:

a) the value of a variable determined by only a source is the value of the source times the path coefficient;
b) the value of a variable determined by two or more sources is the sum of the source values, each multiplied by its respective path coefficient;
c) the value of a variable determined by two or more sources is the sum of the source values, each multiplied by its respective path coefficient. The order of summation does not matter;
d) path branching from a variable is ignored in writing the equation for that variable, but very incoming arrow signal a term that must be include. Moreover, because this study has taken an open system approach, all dependent variables of the model are likely to be affected from the environment; hence all the equations will include a disturbance term \( \mu \).

Based on the conceptual causal model on Fig. 31, and on the preceding rules, a series of sixty four regression-type equations, one for each dependent variable, can be constructed corresponding to conceptual causal model. The equations are given in Appendix 3.

In the equations the P’s represent path coefficient between variables assumed to be directly related, and the \( \mu \)’s are disturbance terms capturing all the variations in the endogenous variables correlated with, and not attributable to, the measured variables.

According to Birnbaum (1981) and to Nie et al (1975), path coefficient (P) = the proportion of the variance explained. However, since the measurement of the causal links of the model, as taken by the questionnaire, are on an ordinal scale, the statistics for
continuous varieties analysis cannot be used. Here, the tools of nonparametric statistics are very useful.

In the case of this study, there are thirty judges each of whom gave ranks to items. By using Kendall’s equation (1.6), the proportion of the variance can be explained:

\[
Pathcoefficient(P) = \frac{\text{variances of ranks}}{\text{max. possible variance of ranks}} \quad (10.7)
\]

Using the above equation, (1.7) a path coefficients can be calculated for each causal link tested by the equations.
Chapter 11: The Extent of Reliability, Validity and Significance of Indices

11.1 Testing of Reliability and Significance of Variables
11.2 Consistency of Answers
11.3 Validity and Reliability of Variables
11.4 Construction of Path Analysis
11.5 Concluding Remarks
CHAPTER 11

THE EXTENT OF RELIABILITY, VALIDITY AND SIGNIFICANCE OF INDICES

11.1 Testing of Reliability, Validity and Significance of Variables

Prior to the examination of association between managerial activities, human resource management, and the performance of the project, a phase of data test was necessary, to test whether the answer given by respondent were significant, reliable and valid. The first concern is to test whether the answers of respondent were consistent.

11.2 Consistency of Answers

Among the ninety-six questions of the questionnaire were included a few pairs of similar questions were included, aimed at bringing out the same attitude to test whether the answers of the respondent were consistent, thereby indicating it as been complete with forethought or at random.

Item 18 How important for a company to provide food, water & other services to the worker Item 53 In your company, what do you think are the other important factors that motivate workers during the execution of work, please choose from below:
a) providing food and water.

The response to item 18 represents the same attitudes as the response on item 53.a as in table 1.

The Pearson chi-square of significance Sub-program of the SPSS was used. The result from the sub-program:

<table>
<thead>
<tr>
<th>Variables</th>
<th>cases</th>
<th>variance</th>
<th>std. deviation</th>
<th>Pearson chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>30</td>
<td>1.288</td>
<td>1.132</td>
<td>0.000</td>
</tr>
<tr>
<td>53a</td>
<td>30</td>
<td>1.266</td>
<td>1.125</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Table 1: Comparison between Question 18 and 53a

The result shows that the Pearson chi-square is equal to 0.000 and 0.003. In as much as the significance is less than 0.05, i.e. that there is a reasonable degree of
association between the sets of the scores forwarded by the respondents. In other words the questionnaires were completed with a reasonable consistency.

11.3 Validity and Reliability of Variables

The mean organizational scores for the 32 in the sample were used to calculate Kendall $\tau$ intercorrelation coefficient scores for 16 variables and the performance indicated by the level of performance measure $Y$. Table 3 (appendix 4) shows the intercorrelation values and the corresponding $\rho$ values for each correlation below it. $\rho$ values are considered at the 0.05 level for significance testing. Using Kendall $\tau$ correlation coefficients in the analysis is due to the ordinal nature of the scales used in scoring and measuring the variables of the study.

As shown, the level of organization of training and development in the company (1) has a very low correlation with organizational performance (0.197) with a statistical significance, which could be interpreted as there is a weak relationship. The level of external and internal environment (2) and level of motivation technique (3) shows high correlations with $\tau$ values of 0.665 and 0.545 respectively, and their level of statistical significance is moderately high with $\rho$ values of 0.000 and 0.000 respectively. These indicate a very strong correlation between these variables and the level of performance in the firms studied.

The level of human resourcing (4), shows low correlation with $\tau$ values of 0.371, and with no statistical significance of 0.066, which could be interpreted as weak relationship. The level of recruitment and selection (5), and training and development of human resources (6) shows high correlations with $\tau$ values of 0.453 and 0.507 respectively, and their level of statistical significance is moderately high with $\rho$ values of 0.008 and 0.021 respectively. These values indicate a very strong correlation between these variables and the level of performance in the firms studied. The level worker’s behaviour (attitude, skill, knowledge and ability) (7), shows high correlations with $\tau$ values of 0.439, and the level of statistical significance is with $\rho$ values of 0.038. These indicate a very strong correlation between these variables and the level of performance in the firms studied. Values of $\tau$ values of 0.537, 0.500, 0.750, 0.545 and 0.214, and their respective $\rho$ values 0.014, 0.038, 0.000, 0.001 and 0.004 for the variables continuity of production (9), cost control and effectiveness (10), high quality of production (11), motivated and competence workers (13), and improve of performance time (15), indicates that there are strong and highly significant relationships between these variables and the level of performance of the
Based on these findings, it is seen that, in the construction firms that were studied, a high level of organizational effectiveness indicated by a high level of performance in past projects is associated with a strong human resource development i.e. recruitment and selection, training and development of the human resources. Also, external and internal environment, and motivation techniques play a high level of positive attitude towards change to achieve organization performance. These variables account for much of the variability in performance of the firms studied. However, the other variables that have weak but significant associations also contribute to high level of effectiveness in the firm studied.

Also, this analysis indicated significant bivariate relationships in the anticipated direction, indicating convergent validity (see appendix 4). In the case of both organization of training and development, and productivity and performance of the project, no correlation coefficient is higher than the alpha coefficient of the scale, leading to the suggestion that the measures adopted in the study exhibit discrimination. Overall, tests of reliability and validity lead to the suggestions that the measures adopted and used in later statistical analyses fall within acceptable reliability and validity criteria.

11.4 Construction of the Path Analysis

The path analysis constructed from the regression equations (10.7) in chapter 10, and summarises in appendix 5, suggests for measuring organization training and development, and all measures of end-result are associated with organizational project performance in some way. However, the association between the independent variables and performance differ in three respects: first, in terms of directness, second, in relation to the form of effect and, finally, in terms of the extent of effect. Interpretation of the path system of the model of Fig. 32 starts most naturally with the primary variable, managerial activities variable 1.1. Significant positive path exists from the primary variable, managerial activities variable 1.1 to the 7 managerial subsystems:

- Organization of Training and Selection Subsystem variable 2.1 (P = 0.78)
- Organization of Motivational Subsystem variable 2.2 (P =0.70)
- Organization of Environmental Subsystem variable 2.3 (P =0.44)
- Organization of Structural Subsystem variable 2.4 (P =0.73)
- Organization of Information Subsystem variable 2.5 (P =0.76)
- Organization of Capital Subsystem variable 2.6(P =0.77)
Organization of Resource Composition Subsystem variable 2.7 (P =0.81)

For the purpose of the study, as mentioned before, concentration will be on the Organization of Training and Development Subsystem, variable 2.3, the Organization of Motivation subsystem variable 2.6, and the Organization of Environmental Subsystem variable 2.7. The positive path exists from the Organization of Training and Selection Subsystem variable 2.1 (P = 0.68), the Organization of Motivational Subsystem variable 2.2 (P = 0.63), the Organization of Environmental Subsystem variable 2.3 (P =0.89), the Organization of Structural Subsystem variable 2.4 (P =0.55), the Organization of Information Subsystem variable 2.5 (P =0.73), the Organization of Capital Subsystem variable 2.6(P =0.70) and the Organization of Resource Composition variable 2.7 (p =0.82) to the Human Resource Management variable 3.1. Significant positive path exists from the Human Resource Management variable 3.1 to Human Resource Planning variable 4.1(P =0.66), Resource Effectiveness & Efficiency variable 4.2 (P =0.68), Human Resource Information variable 4.3 (P =0.66), Job Design & Characteristic variable 4.4 (P =0.64), Working Life-balance variable 4.5 (P =0.42), Working Condition variable 4.6 (P =0.44), Working Environment variable 4.7 (P=0.66), Health and Safety variable 4.8 (P=0.45) and Motivation Technique variable 4.9 (P=0.6).

However, the Training and Selection Subsystem, variable 2.1, positively and significantly affect the Human Resource Management variable 3.1, which in turn affect the Human Resource Planning variable 4.1, also will affect the Recruitment variable 5.1 (P=0.16), Selection variable 5.2 (P=0.25), and Training and Development variable (P=0.75). The Recruitment variable 5.1 and Selection variable 5.2 is clearly reflected in the individuals’ Skill variable 6.2 (P=0.52); while Training and Development variable 6.3 strongly influenced:

a) individual Knowledge variable 6.1(P= 0.88),

b) individual Skill variable 6.2 (P=0.48),

c) individual Ability variable 6.3 (P=0.48),

d) individual Attitude variable 6.4 (P=0.84).

Beyond the second groups of intervening variables, which the above interpretations have demonstrated their causal links to be significant with the seven managerial subsystems, there is a third group of nine intervening variables, of which each is connected with a number of significant paths to the previous group. Significant paths exits from each of the second and third groups of intervening variables to each of the ten end result intervening variables. The ten result variable are assumed to mediate, with the other
groups of intervening variables, the effect of management activities on the end result performance of the project.

Finally, the ultimate dependent variable is system performance variable 9.1, and the magnitude of the path coefficient entering it is a proof that all the other variables in the conceptual model are possible causes of system performance.

In summary, all the independent factors exert an effect upon performance, although the impact and form of the effect differ. The finding of indirect links between management activities and the performance of the project supports the proposition developed earlier, leading to suggestion that evidence is found to argue that link between management activities and performance is mediated by human resource management.

11.5 Concluding Remarks

Despite the implicit and explicit linking of managerial activities and human resource development at the project level in many parts of the organization theory, little critical research attention has been devoted to understanding the links between the two concepts mentioned above and the impact that such an association might have on project performance. To evaluate the efficacy of the model present in Fig. 32, a descriptive quantitative research design is clearly appropriate.

Consequently, a multi-industry sample of 65 units was drawn from data base of registered Sudanese firms were selected via the utilization of systematic random selection on a variety of criteria, including company fixed assets, number of employees etc..

In spite of all the precautions which have been considered before writing the questionnaire it is almost impossible to compile questions to test the highly theoretical model which are completely precise, unambiguous, and of interest to all project managers.

While a number of past studies had utilized five-point scales to gauge perceived performance (Kohli, 1989). Barnes et al. (1994), argued that switch to seven-point scales have no effect on principle components analysis, but after improves the reliability of answer consequently to adopt the commonly used five-point scales.

Out of 65 questionnaires, 30 or slightly more than 47 % returned positively completed, after two follow-up reminders. Unfortunately, 2 of the response were ineligible for a variety of reasons.

Overall tests of reliability and validity lead to the suggestion that the resources adopted and used in later statistical analysis fall within acceptable reliability and validity criteria. The initial exploration of data was under taken by the examination of descriptive
statistics measures of manager action, and organization performance. As stated earlier, all items were measured on five-point scales result in mid point of 3. The data emerging from questionnaire, together with the depth of experience of the respondents, provide an empirical proof to the human resource development as a main subject to improve the performance of the project. The data also indicated the importance and possible including motivation technique to motivate and satisfy worker to reach a high productivity in the site. The effect of environmental factors must be included in any study.

The high path coefficients to almost all the causal links of the model substantiate the literature tendency to rate all these variables selected as important to system performance of a construction project.
Effective managerial activities

Variable 1.1

Human resource management variable 3.1

1. Independent variable

2. Primary variable

3. Secondary variable

4. 1st group intervening variable

5. 2nd group intervening variable

6. 3rd group intervening variable

7. 4th group intervening variable

8. 5th group performance variable

9. End Result variable

Fig 32 The Path Coefficient of the Project Managerial Sample for the Conceptual System
Causal Research Model
Chapter 12: Conclusion and Recommendations
12.1 Human Resources as Route to Improved Performance
12.2 Designing a Research Model
12.3 The concept and value of the Model
12.4 Results and Discussion
12.5 Implication and Further Studies
CHAPTER 12

CONCLUSIONS AND RECOMMENDATIONS

12.1 Human Resources as a Route to Improved Performance

The study has explored many aspects of human resource management function and has applied them to the construction industry. Despite numerous studies into the nature of HRM and what it represents, it still remains a widely criticised and ambiguous concept. Most importantly, its contribution to organizational performance remains unclear and is not understood. The aim of this concluding chapter is to bring the concepts of HRM in order to make recommendations to help managers improve the performance of their construction projects. It argues that construction firms should view human resource management as an important enabler of project performance and provides an approach that helps the concepts contained with in the study findings to be put into practice.

Included here are models that emphasize the organization as a system and attempt to assess the effectiveness of the system in terms of its input, transformation, and output. Models that fall into this category include the resource model which views effectiveness, efficiency, and productivity as the ability of the organization as a system, to exploit its environments; the internal process model where effectiveness is judged by the efficiency of the process inside the system; the strategic adaptation model which recognizes and judges effectiveness by the degree of adaptability to external forces, and the open system model which views the organizations as an open system. Effectiveness here is indicated by the ability to meet internal and external challenges. The system approaches was chosen as a valid configurational approach on which to identify criteria of effectiveness for the developed method. The reasons are two-fold. First, a key concept in the system approach is the idea of modelling. Models have become widely accepted tools for studying complex phenomena. Second, system theory itself is not new. The system approach to management is relatively new and different from other approaches.

12.2 Designing a Research Model

Research model, which describes the variables and their relationships relevant to system performance, can be considered either as an efficient summary of the empirical knowledge of a problem, or as an inter-related set of hypotheses. The development of a physical measure that include all managerial and performance variables of the construction industry is far from possible, given the present state of knowledge. This factor
makes the development of meaningful, naive or simple correlation research models impossible and irrelevant to the study. This leaves the causal approach as the only satisfactory alternative research model. Although the use of casual modelling was once largely confined to economic and the biological sciences, it has now become increasingly popular in organizational research. Good causal research models are not easy to construct, and consequently are usually time-consuming and expensive in the process. To develop and construct a useful causal system research model, a primary phase for this study has been:

a) An overview of the history of research into the topic of human resource management finds that literature on human resource development and performance can be categorized into a number of important phases. The comprehensive literature review presented in this study is examined in three stages. First, studies of human resource management are discussed. Second, studies of performance, efficiency and effectiveness in the construction industry are reviewed, and, finally research of the links between human resource development and performance in the construction industry is discussed.

b) From the literature review, a list of managerial activities, human resource management and performance variables can be derived and structured in a subsystem causal model,

c) The development of a conceptual system causal research model to integrate all the subsystems models into one,

d) Collection and evaluation of the respondents (the project managers) to test the different causal assumptions inherent in the model.

The primary phases in the development model construction of this study have been:

1) Management activities: it considered the concepts of management and project management activities needed to determine or influence system performance. The study reviewed the development of modern HRM which has been punctuated by different schools of thought, which, also, have explained the existence, purposes and functioning of organizations in different ways. The study approved that this range of theories is often difficult to reconcile with modern management thought which remains a constantly changing cocktail of different ideas, many of which provide a unique view of organizations and their problems. Also identified a key feature of the study of management and organizational behaviour was that it is difficult to identify a single solution to a particular problem. The management objective has been taken as being a
system performance of the project. Management achieves system performance through organization. Organization is defined as ‘organizing provides the framework of management.’

2) HRM and performance: evaluating the performance of HRM in terms of contribution to project objectives is crucial for an organization to determine how healthy it is, and to focus attention on crucial success indicators such as motivation, morale and loyalty, which were often neglected in an organization. The problem in evaluating HRM performance is that the linkages between good practice and business performance are becoming harder to prove, particularly as organizations increasing outsource, deregulate, and develop responsibility and authority to HRM activities. By placing people-management activities at the centre of organizational strategy, it raises the profile and importance of people and human resource managers as a key competitive resource for an organization.

3) The seven subsystems: these have been singled out for further research. From the literature several variables have been isolated and evaluated in each subsystem for their direct association with each other and their direct and indirect effect on system performance. Selection of the most important variables which have an effect on system performance is important, so is the exclusion of other variables which have greater or lesser effect on construction system performance at the project level. A comprehensive model for each subsystem cannot include all these variables and still be useful.

4) Integration stage: the standard format which has been retained in modelling the seven subsystems with other variables has an important role in structuring the conceptual system causal research model for this study. It would be easy to add more variables or exclude variables contained in the model, and one easily can draw a causal relationship from any one variable to almost any new other variable and find some justifications for it.

5) Testing of the model: the opinions of respondents have been collected by means of a questionnaire on the causal links inherent in the theoretical framework. The results of the statistical tests employed have shown that the significance, the reliability and the validity of the questionnaire’s data are reasonable. Path analysis was employed in this study to establish a quantative measure for the causal links included in the model. The result of Path analysis has confirmed and extended the causal theoretical links in the model, and enhanced some of them and also suggested that the model is valid for
analysing management influences on system performance in the construction industry at the project level.

12.3 The Concept and Value of Model

In an evaluation of studies of managerial activities, human resource development, and organizational performance, it emerged that, while some evidence exists that links between managerial activities and organizational performance, and between human resource and performance, the combined study of all three concepts has been lacking. Consequently, based on theories which suggest that managerial activities and human resources are linked, it was proposed that human resource management mediates the association between managerial activities and system performance of organization at the project level. In an effort to redress this literature imbalance, the results of the survey were analysed and sufficient empirical evidence found to support this claim. Construction of a path analysis provides a main value:

a) The model provides theoretical knowledge and a better understanding of a project manager’s role in the construction industry. It also, in a competitive and dynamic environment, helps the industry understand the increasing complexity of the project manager’s tasks,

b) The model identifies the basic project managerial activities to be performed in a construction industry, and identifies the manner in which these activities contribute to the system performance of the project.

c) The model can provide a practising project manager in the industry with practical guide and a methodology for the application of knowledge and skills already required in the most appropriate area to achieve the desired changes in the system performance,

d) The model enables the project manager in the construction industry at the project level to identify rapidly or detect the cause-and-effect relationship, and thus discover, in time, what, if any, improvement or adverse effects in the interaction influence system will occur as a result of changes in the causal variables,

e) It is also possible to learn from the model what changes in the causal in the end-results variables follow after a particular pattern of changes in the intervening variables. For example, training and development variable 5.3 will cause a change in the system performance variable 9.1 through a series of intervening variables which are shown in Fig. 31 and redrawn in Fig. 32.


Where \( P(9.1)(6.1) \) is a measure of change in variable 9.1 for a given unit change in variable 6.1. If the change in system performance of the project variable 9.1 as a unit change in training and development variable 6.1 is not satisfactory, the reason can equally be in one of the intervening variables 7.5, 7.6 or 7.7. To pursue the above example further, the immediate causes linked with system productivity are the end result performance causal variable group 6, as shown in Fig. 31 and redrawn in Fig. 32.

**Fig. 33 Intervening Variables linking Variables 6.1 and 9.1**
The study has taken an open system approach, so all the dependent variables of the model are likely to be affected by forces from the environment; hence all equations will include a disturbance term $\mu$.

If, as before, the training and development variable 6.1 is improved and the achieved change in the system performance 9.1 is below expectation, then an obvious conclusion within the context of the relationship suggested in Fig. 33, negative change in health and safety variable 7.3 or highly motivated and satisfied worker variable 7.1 may be blamed. As a counter measure, project management may well launch into some change in motivational subsystem variable 2.2 to bring about change in motivational technique variable 4.9 to bring change in highly motivated and satisfied worker.

The study has examined more deeply the cause-and-effect relationship by constructing the model. There are countless examples of corporate and project crises in the construction industry which have arisen as the result of people’s behaviour, and it would seem that human resource management (HRM) has the potential to eliminate more construction risks than any other management approach. More importantly, HRM has the potential to release a significant amount of productive potential in the construction industry which has remained untapped because of the widespread ignorance of good practice in this area. Given increasing client demands for improved performance, the appalling record of the industry in area such as OHS, the onset of globalization and an increasing competitive labour market, the role of HRM in ensuring improved performance is one of the key questions which mangers must address.

f) The model is comprehensive enough to provide a theoretical framework and foundation for further research that could be carried out in the general area of performance study.

12.4 Conclusion

The human element represented by the construction workforce is the main catalyst/determinate of construction efficiency or productivity. Efficiency of workforce in converting resources into a built product is largely dependent on both technology and the sociological environment of the contracting organization and the construction site. Of the 19 contractors who responded to the questionnaire, the workforce composition was as
follows: 8.8% were administrative, 14.9% were engineering, and 28.8% were skilled labour, whilst 48.3 are unskilled labour (see Fig. 34).

![Fig. 34 Workforce Composition in Respondent Companies](image)

Employment in the organizations surveyed was predominantly non-manual, an indication of the growth of subcontracting and self-employment in the industry. The higher the proportion of non-manual employees within the organizations surveyed, the more likely the organization is to have a personnel department. This is significant as the balance of employment in the larger organizations is likely to have shifted against skilled workers in favour of unskilled and professional employees over recent years. As the surveys were biased towards organizations that were known to have no personnel professionals, it was not surprising that the majority of respondent organizations (66.7%) indicated the importance of a human resource department in their company (see Fig. 35).
As presented in Fig. 36, 23.9% of the respondents agreed that the main responsibility of line management is recruitment and selection, 23.1% is development issues, 17.9% is pay and benefits of the workers, 17.2% is of employment aspect, and 17.9% is health and safety. Personnel managers describe their industry as a people-oriented business, with effective teamwork and human initiative perceived as the key to competitive advantage. The shape of construction companies has changed. Emphasis is on management of construction process and redefinition of core business to exclude some aspects of the construction process has diminished the ‘in-house’ requirement for operatives’ skills, and encouraged the utilization of sub-contractors and self-employed labour as a norm. This has fundamentally affected the balance of employment between manual and non-manual labour, and between craft skills and professional or managerial expertise. Pyramid organization with a large manual workforce has been replaced by a structure that is heavier in its directly employed manual base. This change is not unique to the construction industry, but whereas in other sectors it has been accompanied by some rethinking with respect to management style and process, it seems to have had a little effect on management traditions in construction.

When surveys respondent were asked which issues were decided by line or site managers, there was a high level of agreement that line/site management responsibilities
included recruitment and selection of manual employees and the use of self-employed labour at site level. Labour may be needed at short notice and for limited periods, recruited often on a word of mouth basis there is no responsibility of an office-based personnel function responding to requirements and no expectation that they would do so. The shifting of physical location of the construction process and the difference in culture on site from corporate offices keeps the personnel practitioner at a significant remove from any direct intervention. The real power lies outside the personnel department, generally in the hands of site manager. The personnel manager is able to influence but not to control. The personnel manager has a lot of responsibilities but not much real authority. This is in line with the findings of Brenson et al. (1985) that recruitment is mostly informal and conducted at site level, and that head office responsibility is for checking details and for recording information.

The respondents agree that there is skill shortage. 80% agree that there are skill gaps in their company (Fig. 37). Although, recent labour-market statistics in many countries have suggested that skill shortages are becoming a reality, at both craft and professional levels, any significant increase in the industry’s output is likely to cause predicated skills shortages to become a reality for many organizations (Agapiou et al. 1995a). As mentioned before, skills shortages has had a dramatic effect on productivity as stated by Bunn (1977), who in his article cites a BSRIA report claiming that; “...up to 66% of site operatives’ time is squandered due to inefficiency and lack of skill.” It shows that lack of skills
reduces productivity, and that lack of skilled knowledge produces supervisory inefficiency. From this it can be seen that the effects of lack of skilled labour will be reflected in potentiality or time delay of project, which the contractors are always keen to avoid due to the potential costs involved. Project cost may also rise as a result of pushing the tender prices up, and also has the potentiality to destroy the possibility of achieving Latham’s 30% reduction in construction cost.

![Skills Gaps in the Respondent Company](image)

**Fig. 37 Skills Gaps in the Respondent Company**

One issue that could militate against the industry’s ability to cope with increasing skills shortages is its poor image. As mentioned before, construction has one of the worst public images of all industries, being synonymous with high costs, low quality, low prestige, and unsafe and chaotic working practice (Ball 1988). Accompanying this poor image is a widely held perception that career opportunities within the industry are also poor, particularly for the minority groups (Baldry 1997). This will further deepen its recruitment problems.

The Sudanese construction workforce is ageing, and the number of new recruits has been declining dramatically. Moreover, there has been reduction in company in-house training. Construction firms largely rely on recruiting new entrants with low educational qualifications. Unsafe, untidy and unpleasant work environments and unstable employment opportunities contribute to a poor image which is often blamed for putting off higher calibre recruits. This requires that companies implement new strategies attractive to younger employees, and attempt to recruit employees or influence their choices of careers.
at an earlier age. Researches suggest that younger workers have a more cynical approach to work and are motivated by different things than older workers. This has led the new generation of workers to be sceptical about long-term employment and loyalty to an organization. Consequently, young workers expect their work to deliver immediate pay-offs such as independence, flexibility and an enjoyable work environment. How to attract, motivate and retain these young employees will be a major challenge facing organizations in the future. Loughlin and Barling (2001) suggest that this will require that companies accommodate the preferences of the new generation for ‘non-standard’ work, including part-time and temporary work, and ensuring that employees taking these work options are not treated less favourably than other workers. Other researchers such as Maloney (1990) found that quality of work includes the autonomy people are granted in the performance of their work, the participation they are allowed in making decisions that affect them, and the social interactions allowed by the jobs. A positive quality of work life leads to a positive organizational outcome e.g. reduced absenteeism and staff turnover, greater job satisfaction, etc. Therefore, the quality of work life is a major determinant of an organization’s ability to recruit, motivate and retain skilled workers. Fig. 38 show that 68.1% of the respondents agree that recruitment occurred in the same geographical area of the project, 21.3% from the same industry, and 10.6% from relative workers.

Fig. 38  The Recruitment of the Workforce in the Construction Industry

Safety is an issue associated with skills. Accidents rates may rise as less skilled, under-qualified and less knowledgeable operatives do work they are not trained for and
are not familiar with. Lack of skills and knowledge increases risks associated with the personnel safety of the operatives in a risk-laden environment such as the construction site. 90% of the respondents agree to such an argument that training minimizes site accidents (Fig. 39).

![Training Minimizing Site Accidents](image)

**Figure 39 Training Minimizing Site Accidents**

Table 1 and Fig. 40 present the craftsmen’s training and educational backgrounds. Ranges of 3.7% to 37.0% were trained through technical institute, an indication that there has been awareness by the youths in technical education. However, a sum total of the operatives that passed through the apprenticeship schemes surpass those trained through the technical institutes. Craftsmanship is acknowledged to be maintained through one generation passing skills on to the next. For this reason a high percentage (ranging from 3.7% to 44.5%) of basic skills is available in the respondent companies.

<table>
<thead>
<tr>
<th></th>
<th>0-20%</th>
<th>21-40%</th>
<th>41-60%</th>
<th>61%-80%</th>
<th>81%-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>literacy &amp; education</td>
<td>17.9%</td>
<td>3.5%</td>
<td>25.0%</td>
<td>32.2%</td>
<td>21.4%</td>
</tr>
<tr>
<td>basic skill</td>
<td>3.7%</td>
<td>18.5%</td>
<td>14.8%</td>
<td>44.5%</td>
<td>14.8%</td>
</tr>
<tr>
<td>technical training</td>
<td>18.5%</td>
<td>21.5%</td>
<td>18.6%</td>
<td>37.0%</td>
<td>3.7%</td>
</tr>
<tr>
<td>non technical training</td>
<td>40.0%</td>
<td>12.0%</td>
<td>12.0%</td>
<td>32.0%</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

**Table 2 Show the Skill Levels of the Workforce**
96.7% of the respondents agree with the needs of training to alter the behaviour of employees (see Fig. 41) in the way that creates an improvement of organizational goal.
This is in line with the definitions of training that stated: training has been defined as the systematic development of the attitude, knowledge and skill behaviour pattern required by an individual in order to perform adequately a given task or job. Putting it differently, it is an activity which is concerned with making employees more articulate and efficient in the performance of their current tasks or in preparation for a new type of job to meet the dynamic needs of the organization.

![Fig. 41  Training Alter the Behaviour of the Worker](image)

Also, 96.6% agree that training of workers will minimize wastage of construction materials, 100% agree that training will reduce completion time of project due to increase in worker output, 90% argue that training will minimize site accidents, and 86.3% agree that training will reduce frequency of breakdown of construction equipment, tools and machines (Fig. 42). Different and enhanced skills will be required to enable the construction industry to change its practices from those of low-price bidding and high cost, low value output to those producing high quality, profitable work resulting in satisfied customers. Some firms in the industry are already very conscious of the need for a highly skilled workforce, and they devote considerable resources to securing this objective.
Also 76% of the respondents agree that training will increase the productivity and 96.7% agree that training will increase the quality of production, whilst 89.3% agree that training will increase the performance of workers (Fig. 43). Productivity is, therefore, closely related to skills – without skill there is no way for a worker to be productive. Researchers agree that ‘lack of experience and training’ is highly influential to site productivity.

Fig. 42 The Effect of Training
Fig. 43 Training Increase Productivity, High Standard of Quality and Quickness of Performance

Fig. 44 shows that, 82.6% of the respondents argue that the most effective training in their company is the on-site training, while 17.4% off-site say off-site training is more effective. The relatively high percent of on-site training may be due to the fact that operatives during the course of training are equally productive. The study argued that most training is aimed at increasing the abilities and skills of workforce and leads to expectations that the industry will be more effective and productive. These findings agree with the argument of Noe et al. (2000) that stated: “on-the-job training offers a significant advantage over off-the-job training and is used for more than 60% of training provision in the construction industry.” Probably the biggest advantage is that people are still available to deal with
problems occurring in the workplace. However, close proximity to work also has the potentiality of reducing training effectiveness significantly by distracting those who attend. Furthermore, remaining on site can make training seem less attractive and important than away from the project environment.

![Fig. 44 On-site & Off-site Training](image)

The result of the surveys indicates that 54.2% of the respondents say that training is unavailable in their company, 13.6% say that training is available but not related to work needs (Fig. 45). Unfortunately, as Drucker et al. (1996) found that most construction companies are far from being learning organizations, there is no evidence to suggest that the same is not true for construction projects. The challenge of training faces most construction firms from project to project. Results coinciding with what Drucker et al. (1996) also discovered that training was in decline within the construction industry. He found little evidence of old training initiatives being replaced with new ones. Nevertheless, training is still a fundamental requirement for improving organizational performance and filling skills gaps.
Most respondents hold that the following is specified measure for improving the human resource aspects (recruitment, selection, training and development) which contribute to project performance (Fig. 46):

- 86.7% agree about the improvement of cost control and effectiveness of project,
- 11.8% agree about the improvement of machine utilization,
- 11.5% agree about the improvement of the safety of site,
- 10.4% agree about the reductions in the frequency of labours’ turnover,
- 7.2% agree about the reduction of the frequency of absenteeism,
- 12.9% agree about the better continuity of production,
- 12.2% agree about the improvement in performance time,
- 7.9% agree about the reduction in the duration of the project, and
- 12.2% agree about the highly motivated and satisfied labour.
81.1% of the respondents see that the following aspects including providing health security and insurance to worker, and providing food, water and other service to worker will increase productivity (Fig. 47).
Also, the most effective method for motivating workers as respondents indicate are promotion (66.7%), financial reward (93.3%), certificate of appreciation (40%), and care to labour’s family (50%) which is an effective method of motivation (Fig. 48).
A review of empirical findings of work investigating the relationship between financial incentives, motivation and productivity suggests that there are disparities in conclusion (see Laufer and Borcherding, 1981 and Olomolaiye, 1990). Financial incentives can motivate construction workers to put in more effort and produce more, but money by itself is not the only determinant. Within the framework of motivation, productivity is also dependent on the abilities and willingness of labour as well as the clarity of the goals, training and the quality of the equipment to be used in executing the work.

18.5% of the respondents agree that high salary will increase worker’s performance, 26.2% agree on social care, and 55.4% say motivation will increase the performance of the worker (Fig. 49).
The balance of both intrinsic and extrinsic rewards and their perceived equity to individuals is also crucial. The match between individual needs and expectations, and factors such as work conditions, relationship, salary, job design and the manner in which these factors are balanced, can lead to high levels of motivation amongst individuals. Finally, motivation is a vitally important concern to both employees and employers within an organization. Its importance arises from the simple but powerful truth that poorly motivated people are likely to perform poorly at work and gain little satisfaction from their job. As offered by the great Aristotle himself:

“All men seek one goal: success and happiness. The only way to achieve true success is to express yourself completely in service to society. First, have a definite, clear, practical ideal – a goal, an object. Second, have the necessary means to achieve your ends – wisdoms, money, materials, and methods. Third, adjust your means to that end.” Aristotle, 384-322 B.C.

The data shows that 19.6% of the respondents agree that working in Ramadan will affect the performance of the workers, 24.6% agree about the bad weather, 37.0% about the bad environment and 18.8% agree about working at night (Fig. 50). These findings coincide with the argument of Suraji and Duff (2000) in which they stated that: “the reasons provided for this lamentable performance have been numerous, and they include the industry’s ‘macho’ culture, time and cost pressures, the uncertain and technically complex nature of construction work, the fragmented organizational structure, and the relatively hostile and uncontrollable production environment, etc.” Many organizations found that by working towards providing better working conditions, improved career opportunities and more equitable workplace environments they are receiving greater loyalty, better productivity and more added values from their employees.
This in turn helps them to achieve improved levels of performance for clients and hence greater profitability.

![Pie chart showing performance of workers in different environments]

**Fig. 50 Performance of Worker in Different Environment**

The study draws a number of important conclusions. Most importantly, there must be a greater emphasis in the industry on Human Resource Management (HRM) as a key enabler of organizational objectives. Education clearly has an important role to play in changing attitudes, but companies and industry bodies also have an immense responsibility to create more social responsible practices and culture. Without a sustained effort to improve the industry's treatment of people it will keep its negative public image, and remain unattractive to the highest performers, holding back the future development and growth of many organizations. The construction industry must also seek to identify better ways of managing the HRM functions in order that it retains the best employees and ensure a safe, healthy, and motivated workplace.

Training should shorten the learning time for a particular skill by being paced and organized to deal with essential elements in step-by-step or logical ways. Results from the questionnaire reveal that low rates of production might be due to the lack of skills by those carrying out the tasks. Also, it reveals that the skills of those involved are generally too low, or alternatively that the skills are inadequate to undertake a particular task.

In most cases, it is clear that the performance of an individual worker varies, and that the rate of working and the quality of output will differ. These results are not only due
to differences in the level of motivation but also to differences in individual skills and abilities. In order to improve performance the following steps may be taken:

a. Improving methods of workers selection so that skills and abilities better match job requirements,
b. Undertaking more thorough training in order to develop worker skills and abilities,
c. Restructuring the work in order to get a better match between job requirements and existing workers skills and abilities,
d. Improving worker motivation.

The findings of the study reveal important variables concerning labour training, motivation trends and perceptions of construction workers. Indeed, the findings are of immense importance to anyone involved in the construction industry, particularly training organizations and policy makers in their mission to maintain a skilled, competitive and adequate work force able to meet future demands of the industry. The study indicated that a large percentage of the skilled work force requires further training either in the same or a new trade. This implies that in terms of size, the skilled work force is adequate, albeit informally trained and having low levels of education, training and skill (as evident in the poor levels of workmanship experienced in a construction work). Therefore the attention of policy makers and training organization should be directed towards the provision of further training, rather than encouraging new recruits, as at present no further training programmes exist (ICTAD, 1995c). These training programmes preferably should be on a part-time basis (to meet the needs of the majority of workers), and strategies should be identified to encourage existing workers to enrol. One strategy might be to provide on-the-job training by mobile training units. This will allow workers to remain in their hometown with their families and continue with their present employment. Skill grading has long been a major challenge for different reasons. The situation can be improved only by a three pronged approach: (a) restricting the practice of unqualified workers; (b) motivating the work force to acquire such qualifications by providing sufficient compensation in terms of increased wages; and (c) facilitating existing workers to take up the trade test. Career guidance and models are the two areas which have not received attention in any of HRD programmes in Sudan. The results of the study particularly on the labour force age distribution, education level, under-utilization, training needs, job satisfaction and modes of employment can be used to develop career guidance programmes and models for skilled workers such as those involved in the U.S.A (Federle et al., 1993).
One of the key issues to maintaining a qualified and skilled force is the ability to attract and retain candidates of acceptable calibre. Low public perception of construction career discourages young aspirants. One recent study (Rosenthal, 1990) reports: ‘The term “construction worker”, embodied as the unskilled manual labourer, has negative connotations for young people. To youngsters, “construction workers” are ditch diggers they are seeing calling obscenities to passers-by [sic], loafing on the job. Most commonly associated with dirt, sweat, and a gruff demeanour, the construction worker lack prestige, class, and respectability’. This situation is true for all construction industry in all worlds as well, but can be overcome by positive public relations generated within the industry through trade associations.

It is obvious from the results of this study that safety system management alone cannot ensure safety on site. The establishment of good relationships with operatives, unions, safety officers and subcontractors are essentials if safety is to be improved. The research has indicated that co-operation between team members, co-ordination of safety systems, particularly on multi-occupied sites, is important. The concept of safety by group effort is one that should play a vital role in safety improvement. Pay and rewards systems are seen to be major factors in risk taking. Hence, productivity bonus system must be carefully thought out so that supervisors and managers are not tempted to turn a blind eye to safety hazards. Safe working and productivity must go hand in hand, and rewards that compensate the worker for safe working whilst achieving desired levels of productivity must be devised.

By recognizing the value of human resource, construction companies can motivate and assist operatives to work more safely. In order to do that, these companies must maintain and update their workers’ skills and knowledge by training, skill updates and effective on site communication. In view of the peculiar nature of the construction industry and its skill requirements, it is not surprising that the government mainly provides the training facilities and also pays for training, although some collaborative schemes makes it possible for workers to be trained and/or tested within some companies. Given the general and peculiar characteristics of the Sudanese construction industry, it appears that it is appropriate for the government to use the levy-grant system rather than the more popular State training model to develop skill and hence to tackle productivity-impending problems. The same as in the UK construction industry, they retained a central organization which takes responsibility for overseeing training in the industry. The majority of the CITB’ funding comes through a levy contribution from all the construction firms with a turnover
above a certain level. The money is paid back to firms which provide training demand to be at an appropriate standard, as well as being used to subsidise new-entrant training for those without employed status. In an industry which has problems in attracting recruits, it is in the interest of the country for the government to provide the basic skills training so as to minimize skill shortages and free riding and poaching which are prevalent under the voluntary skill model. It appears that much more needs to be done in the construction productivity development programme in Sudan, and in the area of construction HRD, to support this programme. In this respect, the Sudanese experience is not very different from that of other countries. Finegold (1996) points out that many industrialized nations have made numerous attempts to reform their training systems but are still facing many problems. He attributes the persistence of these problems to the inadequacy of State training policies. Finally, closing the vital importance of the trained manpower needs for the construction industry just as much as the industry needs materials, equipment and machinery to sustain and develop same.

12.5 Recommendation for Further Studies

While this study is designed to provide empirical evidence of the links between organization of training and selection, human resource management, and organizational performance, as with most social science studies, the results of the study raise additional questions, while the limitations of research suggest alternative avenues for research. Although the cross-sectional nature of the study precludes claims causality, additional research adopting a longitudinal design would provide interesting insight into the direction of associations. Similarly, while the findings, implications, and conclusions of this study are bounded by the context of the research, potentially fruitful research could involve the replication of this study in a number of different contexts (including specific industries or different countries). Finally, the results of this study are limited and constrained by the measures adopted to gauge training and selection, human resource management, and organizational performance. While the measures were used are accepted as reliable and valid and their selection is defendable, additional insights into associations may be gained by adopting measures of human resource and performance which reflect different perspective. Indeed, while it is hoped that the study will trigger further debate, without additional research it seems likely that it is confusing to both practitioners and theoreticians.

More specific it is useful to conduct a further research in the following areas:
a) A further research on the most intriguing findings of this research model is the link between managerial activities and system performance of the project in the construction industry, and this will form a strong foundation for a number of researches.

b) A research could be conducted for further development and application of the measurements involved in the model.

c) A further research could be conducted on the results of the questioners from the managers of the Sudanese Contractors company to evaluate the future of the human resource development in the Sudanese Building Industry.
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   Development. 2nd Edition, University Collage Environmental
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   Of Labor, Washington, DC.

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   socialization of newcomers. Reading, MA: Addison- Wesley.

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LIST OF APPENDIX
Appendix 1: The Questionnaire

UNIVERSITY OF KHARTOUM
POSTGRADUATE COLLEGE

"Training and Development of Human Resources in the Sudanese Building Industry"
A.S.Hassan*
Assistant Professor
P.O.Box 11111 2006 Khartoum
E-Mail: awadshassan@yahoo.com

Objectives: Construction Performance Data Questionnaire

There is a widespread consensus that training should be encouraged, since it has a desirable effect on productivity and improves the national economic performance. The role of training and development in the human resources management revolution has brought many issues to the fore with renewed vigour. This study investigates the process involved in the development of human resource in the building industry, particular in the Sudanese Building Industry. It also includes an appraisal of human activities in the building industry, which seems important for understanding development objectives and evaluating the effectiveness of current development practices.

The data collected through this questioners, will be used only for the subject above PhD. The successful completion of the work will depend on your full co-operation and answering the questions below. We appreciate your help, giving us your valuable time, thank.

Part A: General Information:

1) Personal Data
Name of Company : .................................................................
Name of person filing the questionnaire : ...........................................
Position : ..............................................................................................

1) a) Type of Company/ Organization/ Institute:

<table>
<thead>
<tr>
<th>Public sector</th>
<th>Private sector</th>
<th>Semi-private</th>
<th>Other specify</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b) Scope of Work:

<table>
<thead>
<tr>
<th>Consultants</th>
<th>Contractors</th>
<th>Both</th>
<th>Other specify</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2) Experience of Company in Years:

<table>
<thead>
<tr>
<th>Less than 5 years</th>
<th>6-10 years</th>
<th>11-20</th>
<th>21 years and above</th>
<th>more than 21</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3) Number of employee constantly employed by the company:

<table>
<thead>
<tr>
<th>Administrative</th>
<th>Engineering</th>
<th>Skilled labor</th>
<th>Unskilled labor</th>
<th>Other specify</th>
</tr>
</thead>
</table>

4) Fixed assets of the company:

<table>
<thead>
<tr>
<th>Less than $25,000</th>
<th>26,000-50,000 $</th>
<th>51,000-100,000 $</th>
<th>More than 100,000$</th>
<th>Other specify</th>
</tr>
</thead>
</table>

**Part B:** A project manager’s opinions of the concept of human resources management and its influence on the performance of a construction project (time, cost, quality and safety).

Each question in this section refers to an aspect of a human resources concept management and the managerial factors that influence the performance at a project level in the construction industry. Please indicate your action to each concept by ticking one number (one box) on a 5-point scale, which range from +2 to –2.

Sample of the scale (to indicate agreement)

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Uncertainty</th>
<th>Disagree or Undecided</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
<td>√</td>
<td>0.0</td>
<td>-1</td>
</tr>
</tbody>
</table>

II) Subject Matters:  

**Managerial Factors:**

5) How strongly do you agree or not agree with statement that a project manager has the opportunity to improve performance of all resources on a construction project through better:

a) Controlling the following environmental factors:
6) Below list in order (1, 2, 3, 4, --) managerial factors with respect to the priority for performance at construction project level.

a) Organization of environmental factors; 

b) Effective organization and composition of resources; 

c) Organization of capital resource; 

d) Organization of effective information, 

e) Effective of a project structure; 

f) utilization of effective training & selection; 

g) Organization of motivation procedures of human resources; 

h) Other, specify.

7) The process of strategy development can be due to one or more of the reason. Please choose from below the reason(s) that fits your Company situation:

a) Increase productivity and performance of a project; 

b) Solve business problem; 

c) Concerns about the future market; 

d) Improve contract bidding; 

e) Improve growth; 

f) Others specify.

8) To what extend is it important to execute a company strategic plan:
9) Do you agree that the evaluation of alternative strategy depends on:

<table>
<thead>
<tr>
<th></th>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>A company’s growth</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>A company’s profit;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Constraints;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Risks involved;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10) From your experience, do you agree that an effective manager would spend more time on:

<table>
<thead>
<tr>
<th></th>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine Communication;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Human resources management;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Operational management;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Outside networking;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11) How strongly do you agree with statement that says the main objective of a company is:

<table>
<thead>
<tr>
<th></th>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Growth;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Technological leadership;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Human resource development;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Professional satisfaction;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12) From the variables below indicate the most effective method used to achieve a company’s main object:

<table>
<thead>
<tr>
<th></th>
<th>V. imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>By individual</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>By teams;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>By cooperate planner;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>By other external strategy consultant;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Others specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13) How strongly do you agree with statement say an external environment factors affect the strategy of your company:

<table>
<thead>
<tr>
<th></th>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Political factor;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Social factor;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Economical factor;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Cultural factor;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>f) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14) Do you agree that these factors normally alter your objective:

<table>
<thead>
<tr>
<th></th>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

15) During the past three months, how often did you receive feedback on your work; please rate by ticking the appropriate box:

<table>
<thead>
<tr>
<th></th>
<th>several times</th>
<th>not a day</th>
<th>a day</th>
<th>week</th>
<th>monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+2</td>
<td>+1</td>
<td>0.0</td>
<td>-1</td>
<td>-2</td>
</tr>
</tbody>
</table>

16) How important for a company to provide health security to the workers:

<table>
<thead>
<tr>
<th></th>
<th>Very Imp.</th>
<th>of no Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

17) How important for a company to provide insurance to the workers:

|                                 | +2        | +1               |

18) How important for the company to provide food, water & other services to the workers:

|                                 | +2        | +1               |

19) How strongly you agree that such factors will increase productivity:
20) From the items below indicate how your company would choose a team group for construction project:

<table>
<thead>
<tr>
<th>V. imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) As usual fashion; 

b) As personal choice; 

c) As self-selection; 

d) Others please specify.

21) In your company, in what way do you think that the improve of a project performance is due to the following basis:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) High integration between building team; 

b) Good communication between building team; 

c) Interdependence of participant; 

d) Others please specify.

22) In what way do you think the absence of top leadership of a project will affect the project:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) Decrease production; 

b) Decrease quality; 

c) Increase of execution time; 

d) Human resource development; 

e) Other specifies.

23) To what extend do you agree with statement that the leader at project level can be selected according to the following:

<table>
<thead>
<tr>
<th>V. imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) Promotion from the labor in the comp.; 

b) Selected from the same industry; 

c) One of the manager relative; 

d) Trained as a leader in the company; 

e) Other specifies.
24) At a project level in your company, do you agree that the role of the leader is as follow, Please choose from below:

<table>
<thead>
<tr>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Supervision only;</td>
<td>+2</td>
</tr>
<tr>
<td>b) Supervision &amp; reporting; to upper manager;</td>
<td>+2</td>
</tr>
<tr>
<td>c) No role other than control;</td>
<td>+2</td>
</tr>
<tr>
<td>d) Other, please specifies.</td>
<td></td>
</tr>
</tbody>
</table>

25) In order to structure the organization of the project effectively, how is it important to consider each of the following:

<table>
<thead>
<tr>
<th>V. imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) project autonomy;</td>
<td>+2</td>
</tr>
<tr>
<td>b) size of contract/project;</td>
<td>+2</td>
</tr>
<tr>
<td>c) nature of technology employed;</td>
<td>+2</td>
</tr>
<tr>
<td>d) number of subcontractors employed together with volume of work subcontracted;</td>
<td>+2</td>
</tr>
<tr>
<td>e) duration and urgency of the project;</td>
<td>+2</td>
</tr>
<tr>
<td>f) External environment factors, i.e. economic, political etc.;</td>
<td>+2</td>
</tr>
<tr>
<td>g) type of contract;</td>
<td>+2</td>
</tr>
<tr>
<td>h) attitude and values of workforce;</td>
<td>+2</td>
</tr>
<tr>
<td>i) the geographical location of a project;</td>
<td>+2</td>
</tr>
<tr>
<td>j) method of the construction of a project (traditional, nontraditional);</td>
<td>+2</td>
</tr>
<tr>
<td>k) the structure of the organization of the headquarters;</td>
<td>+2</td>
</tr>
<tr>
<td>j) method of the construction of a project (traditional, nontraditional);</td>
<td>+2</td>
</tr>
<tr>
<td>x) Others, pleas specify.</td>
<td></td>
</tr>
</tbody>
</table>

26) Please, state below your opinion about managerial factors that affect the performance of the project:

Human Resources Development:
27) How is it important in your opinion to have a Human Resource Department in your company:

<table>
<thead>
<tr>
<th>V. Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

28) What do you think, a human resource manager deal with in your company, please identify the extent of involvement in the variable(s) listed below:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

29) From the list below indicate the primary responsibilities of Line management and Human Resource Departments in major policy decision:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

30) In your opinion how important is it that the following activities take place in your company to ensure the supply, development and motivation of employee:

<table>
<thead>
<tr>
<th>V. Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

Selection and Recruitment:
31) On what basis does the company choose its labour force? Please choose from below the variables that fits your company situation:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) Previous experience;

b) Qualification;

c) Recommendation from others;

d) All of the above;

e) Others please specify.

32) How important for the company to evaluate the performance of workers in your company on the basis of each of the following variables:

<table>
<thead>
<tr>
<th>V. Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) Quantity of work achieved by a worker;

b) Perfection and ability to meet dead line & specified programs;

c) A managers’ report;

d) Others please specify.

33) In your company, have you experienced any difficulty when recruiting to job certain either now or in the past:

<table>
<thead>
<tr>
<th>Very Diff.</th>
<th>not Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

34) In properly organizing training and selection, it is important for management to consider effectively:

<table>
<thead>
<tr>
<th>V. Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) adequate training and development schemes for all members of the project;

b) efficient recruitment and selection methods;

d) Others please specify.

35) What do you think is the most effective source of recruiting in your company? Please, choose from below:
36) What are the other factors that affect the selection of the labour in your company? Please, choose from below:

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Relative workers;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Worker from the same industry;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Worker from the same geographical area;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

37) It is true that the quality of a project’s recruitment and selection procedures is likely to be reflected by their operative’s skills:

<table>
<thead>
<tr>
<th></th>
<th>Absolutely Untrue</th>
<th>Absolutely True</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

38) How important do you think, to evaluate workers’ performance in the following situation:

<table>
<thead>
<tr>
<th></th>
<th>V. Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Yearly;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) 6 month;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Monthly;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Daily;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>e) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Education and Training:**

39) Please rate, the percent of skilled workers available in your company with regards to the following variables:

<table>
<thead>
<tr>
<th></th>
<th>100-81%</th>
<th>81-61%</th>
<th>60-41%</th>
<th>40-21%</th>
<th>20-0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Literacy and education;</td>
<td>+2</td>
<td>+1</td>
<td>0.0</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>b) Basic skills;</td>
<td>+2</td>
<td>+1</td>
<td>0.0</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>c) Technical training;</td>
<td>+2</td>
<td>+1</td>
<td>0.0</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>d) Non-technical training;</td>
<td>+2</td>
<td>+1</td>
<td>0.0</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>e) Others please specify.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

40) In what way and to what degree do you think education and training is important to the development of your company and its employee, please specify below:
a) Care to build the ability of company;  
V. Imp. | Of no Imp.  
+2 | +1 | 0.0 | -1 | -2  

b) Directly coordinated with the strategies & operation;  
+2 | +1 | 0.0 | -1 | -2  

c) Help in the development of labour skill;  
+2 | +1 | 0.0 | -1 | -2  

d) Not available and not important;  
+2 | +1 | 0.0 | -1 | -2  

e) Others please specify.  

41) From the variable below please indicate, in what way education and training of worker will affect construction production on site:  

Always | Never  
+2 | +1 | 0.0 | -1 | -2  

a) Minimization wastage of construction materials;  
b) Reduce completion time of project due to increase in worker output;  
c) Minimizes on site accidents;  
d) Reduce frequency of breakdown of construction equipment tool & machine;  
d) Others please specify.  

42) To what extend do you agree with the statement that training alter the behaviour of employee in the way that creates improvement in the achievement of organizational goal:  

Str. Agree | Str. Disagree  
+2 | +1 | 0.0 | -1 | -2  

a) Supervision only;  

43) To what extend do you think that training in the construction industry affects each of the followings:  

Always | Never  
+2 | +1 | 0.0 | -1 | -2  

a) Attitudes;  
b) Technical and professional knowledge;  
c) Construction skills;  
d) Others please specify.  

44) From below please choose, the most effective method(s) of worker’s training in your company:  

V. Effect | In effect.  
+2 | +1 | 0.0 | -1 | -2  

a) On-site training;  
b) Off-site training;  
c) Both of them;  
d) Others please specify.  

45) In your company, who would benefit most from training and to what extend:
46) From the list below, choose most suitable statement to the nature of training programme in your company:

<table>
<thead>
<tr>
<th>Situation</th>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Less than 16 years;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Over 16 years;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Over 30 years;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

47) In your company, how do you measure the effectiveness of training programmes attended by a labour, please choose from below:

<table>
<thead>
<tr>
<th>Method</th>
<th>V. Effect</th>
<th>In effect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Directly, from actual performance and the quality of work produced;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) From evaluation and surveying report;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Other measures please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

48) To what extend do you agree with the statement that say it is important for management to consider effectively and properly organizing training and selection programs:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Adequate training and development schemes for all members of the project;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Efficient recruitment and selection method;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

49) In trying to organize training, development and selection, do you agree that management should consider the:

<table>
<thead>
<tr>
<th>Resource</th>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Available construction resources in the firm;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Available construction skills in the area;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Geographical location of the project;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
50) In the line below please clearly state your opinion about human resource development factors such as selection, recruitment and training and development that affect the performance of the project:

51) i) From the list below, what do you think is the most important variable(s) in rewarding workers and to what extend:

<table>
<thead>
<tr>
<th>V. Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>a) High productivity;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>b) High standard of work quality;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>c) Efficiency and utilizing of materials;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>e) Other, please specify</td>
<td></td>
</tr>
</tbody>
</table>

ii) Please rate the importance of the following variable(s) in accordance to your company’s experience on how a rewarded worker would show his appreciation to the company:

<table>
<thead>
<tr>
<th>V. Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Care to build the ability of company; a) Quickness of performance;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>b) Immediate response to work task;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>c) Manager discipline;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>d) Yearly outcomes standard;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>e) Others please specify</td>
<td></td>
</tr>
</tbody>
</table>

52) How effectively would you motivate employees in your company, select from below the procedure(s) adopted in your company:

<table>
<thead>
<tr>
<th>V. Effect</th>
<th>In effect.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Promotion;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>b) Financial rewards;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>c) Certificate of appreciation;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>d) Care to labor’s family (visit);</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>e) Other measures please specify.</td>
<td></td>
</tr>
</tbody>
</table>

53) In your company, what do you think are the other important factors that motivate workers during the execution of work, please choose from below:

<table>
<thead>
<tr>
<th>V. Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Providing food and water;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
</tbody>
</table>
b) Providing transportation;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]

c) Providing shelter;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]

d) Providing care services;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]

e) Other, please specify.

54) What do you think the effective ways to appreciate labor’s efficiency and to what extent:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
</table>
| a) No response, because they receive their salary;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| b) ‘Thank you’ from the manager;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| c) ‘Thank you’ and a letter of appreciation;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| d) Appreciate publicity;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| e) Others please specify.  

55) To what extent does your company use labor motivation as a tools that helps in:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
</table>
| a) Planning;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| b) Internal training;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| c) External training;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| d) Incentives;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| e) Others please specify.  

56) How often would your company motivate its workers and to what degree, please tick from below:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
</table>
| a) Daily;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| b) Weekly;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| c) Monthly;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| d) Yearly;  
\[ +2 \quad +1 \quad 0.0 \quad -1 \quad -2 \]
| e) Others please specify.  

57) In your opinion how would a company improve the work performance of labor:
Attitude and Behaviour:

58) What kind of changes has the company experienced over the last five years, please tick from below:

<table>
<thead>
<tr>
<th>Very Good Changes</th>
<th>No Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) New technology;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>b) More competitors;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>c) More customers’ need;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
</tr>
</tbody>
</table>

59) To what extend is it true that poor attitude in the construction project will be affected by the structure of a project organization:

<table>
<thead>
<tr>
<th>True</th>
<th>Untrue</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2 +1 0.0 -1 -2</td>
<td></td>
</tr>
</tbody>
</table>

60) It is likely that an individual’s attitude of operatives is as harmful as lack of skills in the determination of performance:

<table>
<thead>
<tr>
<th>True</th>
<th>Untrue</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2 +1 0.0 -1 -2</td>
<td></td>
</tr>
</tbody>
</table>

61) How important are the following factors in the determination of the ability of a construction worker:

<table>
<thead>
<tr>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) His construction skills;</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>b) His technical &amp; professional knowledge</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>c) His attitudes towards job, role etc.,</td>
<td>+2 +1 0.0 -1 -2</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
</tr>
</tbody>
</table>

62) How strongly do you agree or not agree with statement that the attitude and behaviour of worker can be affected by training, development and selection toward certain job:
63) What attempt have been done in your company to develop workers’ ability to perform a particular tasks and to what extend, please tick from below:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) No attempts, but naturally;

b) By training;

c) By direction;

c) Others please specify.

64) In your company, do you agree that there is skill gaps within the existing workforce:

<table>
<thead>
<tr>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

65) Please rate the following factor(s) according to their importance in producing the skills gap facing your company:

<table>
<thead>
<tr>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

a) Declining skills of graduate student;

b) Introducing new material and technology;

c) unavailability of training and development;

d) Others please specify.

66) Do you agree that it is important that labour must have skill certification to define their competence in the job:

<table>
<thead>
<tr>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>

67) The need for skill building and technical training in your company, is generally a functions of changes in job requirements resulting from one or more of the followings variables listed below, please choose the variables that suited your company:
68) In your company, enhancing the ability of workers more effectively in a project by teambuilding is important in many ways as individuals, please indicate from below:

<table>
<thead>
<tr>
<th></th>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) To communicate better;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) To improve problem solving capabilities;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) To make better decisions;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

69) In your company, what are the important factors that play a strong role in determining the workers’ behaviour, please choose from below:

<table>
<thead>
<tr>
<th></th>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Personal outcomes;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) The immediate supervision;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) The working group;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) The organizations’ policy;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>e) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

70) In your company, to what degree the following factors of labor’s attitude will influence the performance of the project, please choose from below:

<table>
<thead>
<tr>
<th></th>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Attitude towards project &amp; its member;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Attitudes towards the individual role;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Attitudes towards action;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

71) How is it true that the rapid turnover of labour in the construction industry is due to the following:

<table>
<thead>
<tr>
<th></th>
<th>True</th>
<th>Untrue</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Worker being engaged in jobs which have no competence;</td>
<td>+2</td>
<td>-1</td>
</tr>
</tbody>
</table>
b) Failure to inform workers adequately about the type of work;  
\[\begin{array}{|c|c|c|c|c|}
\hline
 & +2 & +1 & 0.0 & -1 & -2 \\
\hline
c) Failure to inform workers  
d) Failure to inform worker about conditions of employment;  
\[\begin{array}{|c|c|c|c|c|}
\hline
 & +2 & +1 & 0.0 & -1 & -2 \\
\hline
e) Others please specify.  
\[\begin{array}{|c|c|c|c|c|}
\hline
\end{array}\]

72) Please state below your opinion about motivation factors that affect the performance of the project:

Environmental Forces:

73) For a more effective organization of resources at a project level, do you think it is important to introduce:

\[\begin{array}{|c|c|c|c|c|}
\hline
& Very Imp. & Of no Imp. & \\
\hline
a) Optimum level of mechanization; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
b) Optimum level of specialization & subcontracting; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
c) Optimum level of manufacturing  
d) The organizations’ policy; of building materials off the site; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
e) Others please specify.  
\[\begin{array}{|c|c|c|c|c|}
\hline
\end{array}\]

74) How important is the introduction of each of the following concepts to the effectiveness of organization and composition of resources at the activity level:

\[\begin{array}{|c|c|c|c|c|}
\hline
& Very Imp. & Of no Imp. & \\
\hline
a) Optimum level of mechanization; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
b) Optimum level of specialization & subcontracting; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
c) Off-site manufacturing of materials; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
d) Effective use of human resource; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
e) More application of scientific design & tool improvement techniques; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
e) Others please specify.  
\[\begin{array}{|c|c|c|c|c|}
\hline
\end{array}\]

75) How strongly do you agree that a great deal of project management time is given to chasing and interpreting:

\[\begin{array}{|c|c|c|c|c|}
\hline
& Str. Agree. & Str. Disagree & \\
\hline
a) General information i.e. technical & resources information the project use; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
b) Project information i.e. drawings etc.; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
c) Firm information i.e. information about the firms resources etc.; & +2 & +1 & 0.0 & -1 & -2 \\
\hline
\end{array}\]
d) Others please specify.

76) In your company, are there more informal meetings for sharing information and making workforce feels more involved:

<table>
<thead>
<tr>
<th>Very Positive</th>
<th>No Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>0.0</td>
<td>-1</td>
</tr>
<tr>
<td>-2</td>
<td></td>
</tr>
</tbody>
</table>

77) Do you agree that organization and composition of project resources could improve if firm management has considered that an earlier stage:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>0.0</td>
<td>-1</td>
</tr>
<tr>
<td>-2</td>
<td></td>
</tr>
</tbody>
</table>

78) Please state your opinion about environmental factors that affect the performance of the project:

<table>
<thead>
<tr>
<th>Effectiveness, Productivity and performance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness, Productivity and performance:</td>
</tr>
<tr>
<td>Effectiveness, Productivity and performance:</td>
</tr>
<tr>
<td>Effectiveness, Productivity and performance:</td>
</tr>
<tr>
<td>Effectiveness, Productivity and performance:</td>
</tr>
</tbody>
</table>

79) Which of the following variables and to what degree, do you use to measure productivity of workers in your company per:

<table>
<thead>
<tr>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>0.0</td>
<td>-1</td>
</tr>
<tr>
<td>-2</td>
<td></td>
</tr>
</tbody>
</table>

80) Which of the following variables, and to what degree, it is important to increased the performance of worker:

<table>
<thead>
<tr>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>0.0</td>
<td>-1</td>
</tr>
<tr>
<td>-2</td>
<td></td>
</tr>
</tbody>
</table>

81) Which of the factors listed below and to what degree, do you think the important to compete in the global economy:

<table>
<thead>
<tr>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
a) Educated and trained workers;  

b) Institute quality improvement process;  
c) Life long learning organization;  
d) Others please specify.  

82) Please rate the following factors according to their importance in affecting the performance of the workers in your company:

a) Working in Ramadan;  

b) Working in bad weather;  
c) Working in bad environment;  
d) Working at night;  
e) More application of scientific design & tool improvement techniques;  
e) Others please specify.

83) Which of the following activities does your company use to measure a labor performance:

a) Develop emergency programmed to solve a particular problem;  

b) Asking managers to report about their vision;  
c) Secret questioners;  
d) Others please specify.

84) How does your company respond to the defect in the performance of labor and to what extend, please indicate from below:

a) Left without solving;  
b) Be solved when there is enough time;  
c) Solved firstly quickly;  
d) Others please specify.

85) In your opinion and according to your experience, workers are not meeting the target output due to:

a) Under qualification;  

-330-
b) Under trainee;  
|          | +2 | +1 | 0.0 | -1 | -2 |

c) Under experience;  
|          | +2 | +1 | 0.0 | -1 | -2 |

d) Others please specify.

86) In your opinion and according to your experience, the decrease in quality of production is due to the lack of:

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Direct supervision;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Continuous evaluation;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Working in bad environment;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

87) Projects do not meet their deadlines, normally due to:

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Unqualified labor force;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Untrained labor force;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Unavailability of direct supervision;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

89) Increasing the mental capacity of a worker to handle a complex job would be achieved by:

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Training and development;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Direct supervision;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) Effective leadership;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>d) Motivation;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>e) Others please specify.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

90) The satisfaction of individuals in a construction project is important because it affect:

<table>
<thead>
<tr>
<th></th>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Rate of turnover;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>b) Rate of absenteeism;</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>c) The frequency of strikes and disputes;</td>
<td>+2</td>
<td>+1</td>
</tr>
</tbody>
</table>
d) The level of performance time; \[+2 +1 0.0 -1 -2\]
e) The frequency of mistakes and errors; \[+2 +1 0.0 -1 -2\]
f) Others please specify.

91) Do you agree that using a project manager’s tools to motivate labor is important to:

<table>
<thead>
<tr>
<th>Str. Agree</th>
<th>Str. Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Increase labor effectiveness; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>b) Increase the production; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>c) Develop competition spirit between labors; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>d) Increasing labor care; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>e) Others please specify.</td>
<td></td>
</tr>
</tbody>
</table>

92) To what extent do you accept each of the following measures to improve the performance in the construction industry:

<table>
<thead>
<tr>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Cost control and effectiveness of project; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>b) Advanced of machine utilization; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>c) Raise the safety of the resource in the site; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>d) Reductions in the rate of labour turnover; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>e) Reductions in rate of absenteeism; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>f) Improvement in the continuity of production; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>g) Improvements in performance time; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>i) Improvement of motivation and satisfaction of the labour; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>k) Others please specify.</td>
<td></td>
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</tbody>
</table>

93) How important is the introduction of the following concepts to the effectiveness, efficiency and competence of the resources at the job level:

<table>
<thead>
<tr>
<th>Very Imp.</th>
<th>Of no Imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Effective use of the human resources; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>b) Introduction of training and development of worker; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>c) Recruitment and selection of high qualified worker; [+2 +1 0.0 -1 -2]</td>
<td></td>
</tr>
<tr>
<td>d) Others please specify.</td>
<td></td>
</tr>
</tbody>
</table>

94) How important are the followings factors in the determination of the ability of construction worker abilities:
a) Individuals’ characteristics factors, i.e. needs, interest & attitudes;  
Very Imp. Of no Imp.  
+2 +1 0.0 -1 -2  
b) Work environment factors, i.e. group cohesion, project work climate etc.;  
Very Imp. Of no Imp.  
+2 +1 0.0 -1 -2  
c) Job characteristics factors, i.e. type of rewards, variety of tasks etc.;  
Very Imp. Of no Imp.  
+2 +1 0.0 -1 -2  
d) Others please specify.  

95) Do you agree that the following measures for the improving to the contribution human resource aspect (recruitment, selection, training and development) to project performance:

a) Improvement of cost control and effectiveness of project;  
Str. Agree Str. Disagree  
+2 +1 0.0 -1 -2  
b) Improvement of machine utilization;  
+2 +1 0.0 -1 -2  
c) Improvement of the safety of the site;  
+2 +1 0.0 -1 -2  
d) Reductions in the frequency of labors’ turnover;  
+2 +1 0.0 -1 -2  
e) Reductions in the frequency of absenteeism;  
+2 +1 0.0 -1 -2  
f) better continuity of production;  
+2 +1 0.0 -1 -2  
g) Improvements in performance time;  
+2 +1 0.0 -1 -2  
h) Reductions in the duration of project activities;  
+2 +1 0.0 -1 -2  
i) High motivated and satisfied labour;  
+2 +1 0.0 -1 -2  
j) Others please specify.

96) Do you agree and to what extend that more benefit for your company are acquired from:

a) Rewards;  
Str. Agree Str. Disagree  
+2 +1 0.0 -1 -2  
b) Certificate;  
+2 +1 0.0 -1 -2  
c) Confidence;  
+2 +1 0.0 -1 -2  
d) Add more responsibility;  
+2 +1 0.0 -1 -2  
e) Selection of the ideal worker of the month;  
+2 +1 0.0 -1 -2  
f) Care to labors’ family;  
+2 +1 0.0 -1 -2  
g) Others please specify.

97) Please state your opinion about effectiveness, efficiency and competence factors that affect the performance of the project and/or the questioners would be appreciated:

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### Appendix 2: Name of company

<table>
<thead>
<tr>
<th>Name of Company</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyter Engineering Company</td>
<td>Khartoum North, Ismail Elazahri street</td>
</tr>
<tr>
<td>Danfodio for Contracting - Roads &amp; Bridge</td>
<td>Khartoum 2, near to Faroug cemetery</td>
</tr>
<tr>
<td>Concrete Engineering Company</td>
<td>katherina street / Khartoum 2</td>
</tr>
<tr>
<td>TECHMO</td>
<td>Khartoum / Mohamed Nageeb street</td>
</tr>
<tr>
<td>Daroo Pre-Fabricated Building &amp; Construction Company</td>
<td>Elsheikh Mustafa Elamin building / Gamhoria Street</td>
</tr>
<tr>
<td>Centres for Engineering Consultation &amp; Studies</td>
<td>Elsheikh Mustafa Elamin building / Gamhoria Street</td>
</tr>
<tr>
<td>Gamma Engineering</td>
<td>Central Khartoum / Elekahowa building</td>
</tr>
<tr>
<td>M.H. Consultation Engineering</td>
<td>Central Khartoum / Elekahowa building</td>
</tr>
<tr>
<td>Sinan Group Company</td>
<td>Aboulela Building / Elbalidiy street</td>
</tr>
<tr>
<td>Edco Engineering Company</td>
<td>Abdel Rahman Street / Sharwing building</td>
</tr>
<tr>
<td>Ministry of Physical Planning &amp; Public Utilities</td>
<td>El Nile street, near to Grand Hotel</td>
</tr>
<tr>
<td>Quality Project Management</td>
<td>Elfatih Tower / Khartoum</td>
</tr>
<tr>
<td>OTECH</td>
<td>Abdel Rahman Street / Sharwing building</td>
</tr>
<tr>
<td>Building International Consultation Office</td>
<td>Central Khartoum / Gamhoria street</td>
</tr>
<tr>
<td>Abadir Construction Company</td>
<td>Omdurman / Wadnabawa street</td>
</tr>
<tr>
<td>Africot Engineering Company</td>
<td>Khartoum East / Elharriya street</td>
</tr>
<tr>
<td>Gusour for Contracting Company Ltd</td>
<td>Central Khartoum / Elekahaw Building</td>
</tr>
<tr>
<td>Elshibly Engineering</td>
<td>Elhaliya street</td>
</tr>
<tr>
<td>Tamer Company Ltd</td>
<td>Gamhoria Street / Elsheikh Mustafa building</td>
</tr>
<tr>
<td>Ministry of National Defence</td>
<td>Central Khartoum</td>
</tr>
<tr>
<td>M. Nageeb Aboulela Engineering and Service</td>
<td>Gamhoria Street, Abdel Moniem building</td>
</tr>
<tr>
<td>Bakihat E. Ahmed Contracting Company</td>
<td>Elekahowa Building / Central Khartoum</td>
</tr>
<tr>
<td>Elgoula Contracting Company</td>
<td>Elehorriya street</td>
</tr>
<tr>
<td>Ali Elkheir &amp; Sirag Contracting Company</td>
<td>Elbaladiya street</td>
</tr>
<tr>
<td>M.B.I Engineering &amp; contracting Company</td>
<td>Elehorriya street</td>
</tr>
<tr>
<td>Tebno for Construction</td>
<td>Gamhoria Street / near to Dairat El Mahdi</td>
</tr>
<tr>
<td>Newtech consultant</td>
<td>Khartoum / Elriyhad, house no. 33</td>
</tr>
<tr>
<td>Dar consultant</td>
<td>Junction of Gamhoria street &amp; Elhorriya street</td>
</tr>
<tr>
<td>M.C. International</td>
<td>Khartoum / street 2, plot 67, block 6, house 11</td>
</tr>
<tr>
<td>Dar El Amaran</td>
<td>Aboulela Building / Elbalidiy street</td>
</tr>
</tbody>
</table>
Appendix 3: The regression equations of the conceptual causal research model illustrated in Fig. 32

1. variable 1.1 = μ(1.1)
2. variable 2.1 = P (2.1) (1.1) variable 1.1 + μ(2.1)
3. variable 2.2 = P (2.2) (1.1) variable 1.1 + μ(2.2)
4. variable 2.3 = P (2.3) (1.1) variable 1.1 + μ(2.3)
5. variable 2.4 = P (2.4) (1.1) variable 1.1 + μ(2.4)
6. variable 2.5 = P (2.5) (1.1) variable 1.1 + μ(2.5)
7. variable 2.6 = P (2.6) (1.1) variable 1.1 + μ(2.6)
8. variable 2.7 = P (2.7) (1.1) variable 1.1 + μ(2.7)
9. variable 3.1 = P (3.1) (2.1) variable 2.1 + μ(3.1)
10. variable 3.1 = P (3.1) (2.2) variable 2.2 + μ(3.1)
11. variable 3.1 = P (3.1) (2.3) variable 2.3 + μ(3.1)
12. variable 3.1 = P (3.1) (2.4) variable 2.4 + μ(3.1)
13. variable 3.1 = P (3.1) (2.5) variable 2.5 + μ(3.1)
14. variable 3.1 = P (3.1) (2.6) variable 2.6 + μ(3.1)
15. variable 3.1 = P (3.1) (2.7) variable 2.7 + μ(3.1)
16. variable 4.1 = P (4.1) (3.1) variable 3.1 + μ(4.1)
17. variable 4.2 = P (4.2) (3.1) variable 3.1 + μ(4.2)
18. variable 4.3 = P (4.3) (3.1) variable 3.1 + μ(4.3)
19. variable 4.4 = P (4.4) (3.1) variable 3.1 + μ(4.4)
20. variable 4.5 = P (4.5) (3.1) variable 3.1 + μ(4.5)
21. variable 4.6 = P (4.6) (3.1) variable 3.1 + μ(4.6)
22. variable 4.7 = P (4.7) (3.1) variable 3.1 + μ(4.7)
23. variable 4.8 = P (4.8) (3.1) variable 3.1 + μ(4.8)
24. variable 4.9 = P (4.9) (3.1) variable 3.1 + μ(4.9)
25. variable 5.1 = P (5.1) (4.1) variable 4.1 + μ(5.1)
26. variable 5.2 = P (5.2) (4.2) variable 4.2 + μ(5.2)
27. variable 5.3 = P (5.3) (4.3) variable 4.3 + μ(5.3)
28. variable 5.4 = P (5.4) (4.4) variable 4.4 + μ(5.4)
29. variable 5.5 = P (5.5) (4.5) variable 4.5 + μ(5.5)
30. variable 5.6 = P (5.6) (4.6) variable 4.6 + μ(5.6)
31. variable 5.7 = P (5.7) (4.7) variable 4.7 + μ(5.7)
32. variable 5.8 = P (5.8) (4.8) variable 4.8 + μ(5.8)
33. variable 5.9 = P (5.9) (4.9) variable 4.9 + μ(5.9)
34. variable 6.1 = P (6.1) (5.1) variable 5.1 + μ(6.1)
35. variable 6.2 = P (6.2) (5.2) variable 5.2 + μ(6.2)
36. variable 6.3 = P (6.3) (5.3) variable 5.3 + μ(6.3)
37. variable 6.4 = P (6.4) (5.4) variable 5.4 + μ(6.4)
38. variable 7.1 = P (7.1) (6.1) variable 6.1 + μ(7.1)
39. variable 7.2 = P (7.2) (6.1) variable 6.1 + μ(7.2)
40. variable 7.3 = P (7.3) (6.1) variable 6.1 + μ(7.3)
41. variable 7.4 = P (7.4) (6.1) variable 6.1 + μ(7.4)
42. variable 7.5 = P (7.5) (6.1) variable 6.1 + μ(7.5)
43. variable 7.6 = P (7.6) (6.1) variable 6.1 + μ(7.6)
44. variable 7.7 = P (7.7) (6.1) variable 6.1 + μ(7.7)
45. variable 7.8 = P (7.8) (6.1) variable 6.1 + μ(7.8)
46. variable 7.1 = P (7.1) (6.2) variable 6.2 + μ(7.1)
47. variable 7.2 = P (7.2) (6.2) variable 6.2 + μ(7.2)
48. variable 7.3 = P (7.3) (6.2) variable 6.2 + μ(7.3)
49. variable 7.4 = P (7.4) (6.2) variable 6.2 + μ(7.4)
50. variable 7.5 = P (7.5) (6.2) variable 6.2 + μ(7.5)
51. variable 7.6 = P (7.6) (6.2) variable 6.2 + μ(7.6)
52. variable 7.7 = P (7.7) (6.2) variable 6.2 + μ(7.7)
53. variable 7.8 = P (7.8) (6.2) variable 6.2 + μ(7.8)
54. variable 7.1 = P (7.1) (6.3) variable 6.3 + μ(7.1)
55. variable 7.2 = P (7.2) (6.3) variable 6.3 + μ(7.2)
56. variable 7.3 = P (7.3) (6.3) variable 6.3 + μ(7.3)
57. variable 7.4 = P(7.4)(6.3) variable 6.3 + μ(7.4)
58. variable 7.5 = P(7.5)(6.3) variable 6.3 + μ(7.5)
59. variable 7.6 = P(7.6)(6.3) variable 6.3 + μ(7.6)
60. variable 7.7 = P(7.7)(6.3) variable 6.3+ μ(7.7)
61. variable 7.8 = P(7.8)(6.3) variable 6.3 + μ(7.8)
                   P(8.1)(7.4) P(8.1)(7.5) P(8.1)(7.6) 
                   P(8.1)(7.7) P(8.1)(7.8) variable 7.1+ μ(8.1) 
63. variable 8.2 = P(8.2)(7.1) P(8.2)(7.2) P(8.2)(7.3) 
                   P(8.2)(7.4) P(8.2)(7.5) P(8.2)(7.6) 
                   P(8.2)(7.7) P(8.2)(7.8) variable 7.1+ μ(8.2) 
64. variable 8.3 = P(8.3)(7.1) P(8.3)(7.2) P(8.3)(7.3) 
                   P(8.3)(7.4) P(8.3)(7.5) P(8.3)(7.6) 
                   P(8.3)(7.7) P(8.3)(7.8) variable 7.1+ μ(8.3) 
65. variable 9.1 = P(9.1)(8.1) P(9.1)(8.2) P(9.1)(8.3) + μ(9.1)
<table>
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<td>.134</td>
<td>.452</td>
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<td></td>
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<tr>
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<td>.409</td>
<td>.283</td>
<td>.397</td>
<td>.234</td>
<td>1.00</td>
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<tr>
<td>Worker's behaviour</td>
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<td>.510</td>
<td>.400</td>
<td>.273</td>
<td>.390</td>
<td>.297</td>
<td>1.00</td>
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<td>.361</td>
<td>.473</td>
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<td></td>
</tr>
<tr>
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Table 3: The Intercorrelation values & the Corresponding ρ values (<0.05 is significant)
Appendix 5: The calculation of the Path Coefficient of the Conceptual Causal Research Model

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