# Factors Affecting the Performance of Construction Projects: A Survey of Construction Projects in the Coastal Region of Kenya

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***Abstract-*** Project performance is a critical issue for the construction industry. Project deliverables such as timely completion and client satisfaction are often used as yardsticks to determine success. More often than not, the success of a construction project hinges on the ability of the construction project manager to effectively perform his job functions with the intended efficacy. Because the industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders, regulators and others. Construction projects in the Coastal region of Kenya suffer from many problems and complex issues in performance some of which includes cost, time and safety. As such this research evaluated firstly evaluate the factors affecting the performance of construction projects in order to assist owners, consultants and contractors to overcome performance problem and to improve performance of their construction projects secondly to determine the influence to which the external environment affects performance of construction projects thirdly to identify the most significant project procedures that affect performance of projects and lastly to evaluate project management actions project performance. Respondents comprising of project managers clients, contractors and consultants in construction firms throughout the coastal region of Kenya were selected as the sample population. Questionnaires were then distributed and collected from the sampled population respondents. Gathered data was analyzed to identify those factors that affect the performance of construction projects in the Coastal region of Kenya.

A questionnaire survey was conducted and 40 factors were identified, categorized into 8 groups, evaluated and ranked from owners, consultants and constructors perspectives. 180 questionnaires were distributed to owners, consultants and contractors. 132 questionnaires were received. The most important factors agreed by the owners, consultants and contractors were: average delay because of closures and materials shortage; availability of resources as planned through project duration; leadership skills for project manager; escalation of material prices; availability of personals with high experience and qualification; and quality of equipment and raw materials in project.

The degree of agreement between parties regarding the ranking of factors was determined according to Kendall's Coefficient of Concordance. For Cost, Time, Quality, Productivity, Client Satisfaction, People, Innovation and learning factors, and all groups together, there is a significant degree of agreement among the owners, consultants and contractors. On the other hand, for Regular and community satisfaction, and Environment factors, there is disagreement of agreement among the owners, consultants and contractors.

The practices concerning with the Project performance such as time, cost, project owner satisfaction and people were analyzed in order to know the main practical problems of projects performance in the coastal region of Kenya and then to formulate recommendations to improve performance of construction projects in the coastal region of Kenya. It was concluded that projects were delayed and the actual cost of projects was more than the estimated cost because of coastal region of Kenya political conditions and delayed payments which results to unavailability of materials. Overall project safety factors had been moderately implemented in construction organizations.

It is recommended for construction organizations to have a clear mission and vision to formulate, implement and evaluate their performance. A structured methodology and technique should be identified to overcome the effect of economic situations on the performance of construction projects in the coastal region of Kenya. In addition, it is recommended to develop human resources in the construction industry through proper and continuous training programs about construction projects performance. It is necessary for construction organizations in Coastal region of Kenya to evaluate both of market share and liquidity before implementation of any construction project because of difficult economic situation. All of that will assist organizations to perform projects successfully and strongly.

***Index Terms***- Project planning, project performance indicators, construction projects project performance

## I. Introduction

The construction industry is the sector involved with erection, repair and demolition of buildings and civil engineering structures in an economy. A definition typical of national income accounts in use in most advanced industrialized countries is as follows: the construction industry entails “the assembly of building materials and/or components on site; the materials and components are supplied by a variety of industries in the manufacturing sector; they are delivered to the site by the transportation and trade sectors; the assembly proceeds in accordance with plans, designs, and management procedures

supplied mainly by the business services industry in the service sector; most of the funds required for construction are supplied by the financial services industry in the service sector; and a significant part of the output supplied by the construction sector is delivered to the real estate industry in the service sector" (Bon 1992).

Construction industry plays a major role in development and achievement the goals of society. Construction is one of the largest industries and contributes to about 10% of the gross national product (GNP) in industrialized countries (Navon, 2005).Construction industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders and regulators. The performance of the construction industry is affected by national economies. Output from the construction industry is a major and integral part of the national output, accounting for a sizeable proportion in the Gross Domestic Product (GDP) of both developed and underdeveloped countries (Crosthwaite, 2000). Lowe (2003) further stated that the value added of construction is in the range of 7% to 10% for highly developed economies and around 3% to 6% for underdeveloped economies

**Worldwide Construction Industry**

The construction industry is the sector involved with erection, repair and demolition of buildings and civil engineering structures in an economy. A definition typical of national income accounts in use in most advanced industrialized countries is as follows: the construction industry entails "the assembly of building materials and/or components on site; the materials and components are supplied by a variety of industries in the manufacturing sector; they are delivered to the site by the transportation and trade sectors; the assembly proceeds in accordance with plans, designs, and management procedures supplied mainly by the business services industry in the service sector; most of the funds required for construction are supplied by the financial services industry in the service sector; and a significant part of the output supplied by the construction sector is delivered to the real estate industry in the service sector" (Bon 1992: 120).

The role of the construction industry in the socio-economic development of a country cannot be overemphasized. The industry provides constructed physical facilities which provide space where other activities may take place (Hillebrandt 2000). The monetary value of all the buildings and civil engineering works produced by the industry in a given period of time - normally a year – is referred to as the gross output of the construction industry. In the world as a whole, this output is probably about 10% of the Gross National Product (GNP), on average (Hillebrandt 2000). Although the percentage contribution of construction output to GNP varies considerably amongst various economies and geographical locations, this overall average contribution is large enough to justify a rigorous investigation of the dynamics of workload in the global construction industry. The trend of the relative volume of construction output (i.e. relative to the Gross Domestic Product [GDP] in a country evolves as the country develops from being a less developed country (LDC), through being a newly industrialized country (NIC), and into being an advanced industrialized country (AIC).

Excessive fluctuations in construction output, and by implication, demand have very adverse effects on the reputation of the industry as a whole, the business performance of construction firms and the employment of the industry's production resources.

**Construction Industry of Kenya**

Kenya lies across the equator on the East coast of Africa. From the map, it can be observed that it borders Somalia, Ethiopia, and Sudan to the North, Uganda to the West, Tanzania to the South and the Indian Ocean to the East. Kenya's current development status could be viewed in light of its post independence history. Kenya used to have one of the most prosperous economies in East Africa but due to government mismanagement and corruption this has led to an erosion of it's former pre-eminence (www.worldbank.org1kenya 2007). Since 2003, the new government's reform efforts have brought a return to economic growth and have made some inroads against corruption (www.worldbank.orglkenya 2007), however, recent events have caused much of the Kenyan public, and the international community to question the depth of progress made. From independence in 1964 to 1980, the average GDP growth rates of six point five percent reflected the pragmatic policies of Kenya's founding President Jomo Kenyatta. During much of this period, the Kenyan public witnessed a buoyant economy, international community support, investor confidence thrived and communities contributed in cash and the co-operative movement allowed small-scale farmers to participate in the formal economy. The results were impressive. Agriculture thrived through a relatively open and export oriented trading system that also gave ``1pre-eminence to the development of a smallholder sector that produced both food crops and major export commodities.

Kenya is a developing country in East Africa, with a population of about 40 Million people, a Gross Domestic Product (GDP - purchasing power parity) of US Dollar 40.77 Billion and a GDP growth rate of 5.5% (CIA2007). Historically, Kenya's economy was mainly agricultural – with agriculture contributing over 50% of the GDP and providing employment of over 80% of the working population (Mbaya 1984) - up to early this decade. Today, though agriculture employs 75% of the country's labour force, its contribution to the GDP is 16.3%, and is lower than contributions of industry or services, which are 18.8% and 65%, respectively (CIA 2007).

Infrastructural support for the country's economy is provided by the construction industry by way of buildings (housing, office space, retail space, factories, etc) roads, railways, irrigation schemes, water supply schemes etc.

Kenya's building and construction sector is amongst the most rapidly growing, experiencing an average growth rate of 14.2% for the period 2006 – 2011. Over the same period, Kenya's economic growth, as measured by the real Gross Domestic Product rate (GDP) averaged only 4.3% declining to 4.38% in 2011 from 6.33% in 2006. Difficult global macro conditions (effects of high oil prices and the August 2007 commencement of the financial crisis) and Kenya's 2008 post election violence in the midst of a high inflation environment (inflation averaged 9.0%) resulted in the country's subdued economic performance during the period. According to the

Central Bureau of Statistics, the construction industry in Kenya contributes 7 percent of the gross domestic product (GDP). Similar to the case with other developing countries, the Kenyan construction industry shares many of the problems and challenges the industry is facing in other developing countries, perhaps with greater severity. Given the critical role the construction industry plays in Kenya and other developing countries, and the poor level of performance of the industry in those countries, improving the performance of the industry ought to be a priority action. As contractors are one of the key players in the industry and the makers of the final product, any development and improvement initiatives in the industry has to consider ways of improving the capacity and capability of the contractors.

Previous, research works by [Adams, (Long (2004) and others] have indicated poor managerial capability of contractors to be one of the critical problems of the construction industry in developing countries. Thus, improving the managerial capability of contractors need be one of the priority considerations for improvement of capability of contractors in developing countries. Researches by (Dlungwana & Rwelamila, 2004), and others have also strongly emphasized the importance of improving the management skills of contractors. As most of the works of contractors is managed as a project, improving the contractors‟ project management capability can significantly contribute to the overall improvement of contractors‟ capability to deliver successful project. There are many realistic reasons such as closures, amendment of drawings and amendment of the design. In addition, there are other different reasons affecting construction projects performance in Coastal region of Kenya such as poor management and leadership; inappropriate participants; poor relations and coordination; absence of motivation, control, monitor or decision making systems; inadequate infrastructure, political problems; cultural problems and economic conditions (The United Nations Relief and Works Agency, UNRWA, 2000).

While individual organizations have been measuring their performance for many years, there has been little consistency in the data, and the way it has been published. The performance can be measured by key indicators for evaluation. The purpose of Key performance indicators (KPIs) is that clients want their projects delivered: on time, on budget, free from defects, efficiently, right first time, safely, by profitable companies. So, Regular clients expect continuous improvement from their construction team to achieve year-on-year: reductions in project costs and time. In addition, the Key Performance Indicators (KPIs) can be used for benchmarking purposes, and will be a key component of any organization move towards achieving best practice. Clients, for instance, assess the suitability of potential suppliers or contractors for a project, by asking them to provide information about how they response to a range of indicators. Some information will also be available through the industry benchmarking initiatives, so clients observe how potential suppliers compare with the rest of industry in a number of different areas. Construction supply chain companies will be able to benchmark their performance to enable them to identify strengths and weaknesses, and assess their ability to improve over time. The KPIs framework consists of seven main groups: time, cost, quality, client satisfaction, client changes, business Performance, health and safety (DETR, 2000)

In Coastal region, there are many construction projects that are failing in performance. In addition, performance measurement systems are not effective or efficient to overcome this problem. Construction projects performance problem appears in many aspects in the Coastal region. There are many constructed projects fail in time performance, others fail in cost performance and others fail in other performance indicators.

**Statement of the Problem**

It is shown from previous studies (KPI Report),2000; Lehtonen, 2001; Samson and Lema, 2002; Kuprenas, 2003; Cheung, 2004; Iyer and Jha, 2005; Navon, 2005; Ugwa and Haupt, 2007) that the failure of any project is mainly related to the problems and failure in performance. Moreover, there are many reasons and factors which attribute to such this problem. In the Coastal region of Kenya, there are many construction projects which are failing in performance. In addition, performance measurement systems are not effective or efficient to overcome such this problem.

Despite the construction industry's significant contribution to the economy of developing countries and the critical role it plays in those countries' development, the performance of the industry still remains generally low. As Idoko, (2008) noted, many projects in developing countries encounter considerable time and cost overruns, fail to realize their intended benefit oreven totally terminated and abandoned before or after their completion Moreover, the development of the construction industry in developing countries generally lags far behind from other industries in those countries and their counter parts in developed nations. Generally, as [Ofori, (2006) & Jekale, (2004)] concluded, The construction industry in developing countries failed to meet expectations of governments, clients and society as a whole.

Similar to the case with other developing countries, the Kenyan construction industry shares many of the problems and challenges the industry is facing in other developing countries, perhaps with greater severity. Given the critical role the construction industry plays in Kenya and other developing countries, and the poor level of performance of the industry in those countries, improving the performance of the industry ought to be a priority action. As contractors are one of the key players in the industry and the makers of the final product, any development and improvement initiatives in the industry has to consider ways of improving the capacity and capability of the contractors.

Previous, research works by (Long. (2004) and others] have indicated poor managerial capability of contractors to be one of the critical problems of the construction industry in developing countries. Thus, improving the managerial capability of contractors need be one of the priority considerations for improvement of capability of contractors in developing countries. Researches by (Dlungwana & Rwelamila, 2004), and others have also strongly emphasized the importance of improving the management skills of contractors. As most of the works of contractors is managed as a project, improving the contractors' project management capability can significantly contribute to the

overall improvement of contractors' capability to deliver successful projects.

In the Coastal region of Kenya, construction projects performance problem appears through different directions. There are many constructed projects fail in time performance, others fail in cost performance and others fail in other performance indicators. In the recent past there has been many projects which are finished with poor performance because of many evidential reasons such as: obstacles by client, non-availability of materials, roads closure, amendment of the design and drawing, additional works, waiting the decision, handing over, variation order, amendments in Bill of Quantity and delay of receiving drawings (The United Nations Relief and Works Agency, UNRWA, 2007).

In addition there are other indicators of performance in the Coastal region of Kenya such as project managers, coordination between participants, monitoring, feedback and leadership skills. However, there are three important issues related to failures and problems of performance in the Coastal region of Kenya which are political, economic and cultural issues. Therefore, this research will evaluate the factors affecting the performance of construction projects in the Coastal region of Kenya in order to assist owners, consultants and contractors to overcome performance problem and to improve performance of their construction projects. Hence, performance of any construction projects can be evaluated according to key performance indicators.

**Research Objectives**

**General Objective**

The aim of this research is to analyze the local factors affecting the performance of construction projects in the Coastal region of Kenya.

**Specific Objective**

1. To determine the influence to which the external environment affects the performance of construction projects in the Coastal region of Kenya

2. To identify the most significant project procedures that affect performance of construction projects in the Coastal region of Kenya

3. To evaluate the project management actions that affect project performance in the Coastal region of Kenya.

4. To determine the influence to which the project related factors affects the performance of construction projects in the Coastal region of Kenya

## II. LITERATURE REVIEW

**Theoretical Framework for Factors Affecting Project performance**

The various variables affecting the factors are identified in this section. Variables within each group are interrelated and intra-related. A variable in one group can influence a variable in the others, and vice versa. To study how these factors affect project performance separately and collectively, it is hypothesized that Project performance is a function of project-related factors, project procedures, project management actions, human-related factors and external environment
and they are interrelated and intra-related.

It is further hypothesized that the project will be executed will perform more if the project complexity is low; if the project is of shorter duration; the overall managerial actions are effective; if the project is funded by a private and experienced client; if the client is competent on preparing project brief and making decision; if the project team leaders are competent and experienced; and if the project is executed in a stable environment with developed technology together with an appropriate organization structure.

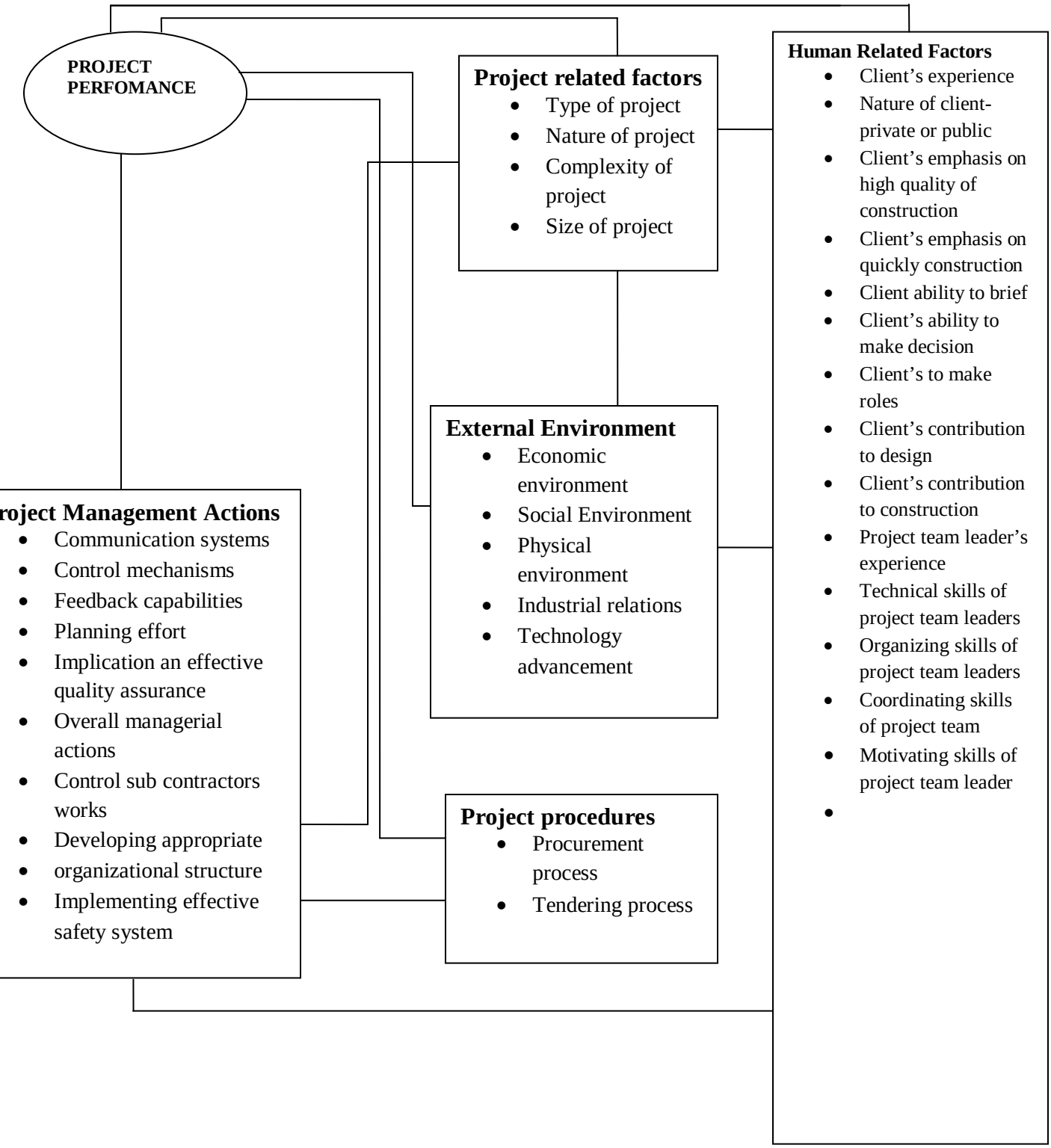


**Figure: 2.1 (sources: Albert P. C. Chan; David Scott; and Ada P. L. Chan)**

**Empirical Literature**

Brown and Adams (2000) presented a new approach to the measurement of the effect of Building Project Management (BPM) on cost, time and quality performance outputs using 15 cases' derived from UK data and by developing a path model in order to achieve that. Chan (2001) studied the cost time relationships in public sectors in Malaysia. Time and cost data were collected from 51 public sector projects. Regression analysis was used to identify the relations between time and cost performance. Kuprenas (2003) studied over 270 completed municipal facilities, storm water, sewer, and street projects within the city of Los Angeles as a case study in order to assess the impact of the use of a project management based organizational structure, project manager training, frequency of design meetings, and frequency of design reports on design phase cost performance.

Iyer and Jha (2005) studied that the factors affecting cost performance by considering a questionnaire survey approach. Love et al (2005) examined project time-cost performance relationships by using project scope factors for 161 construction projects that were completed in various Australian States and using multiple regression technique of weighted lest squares. Ugwu and Haupt (2007) studied the key performance indicators and proposed an analytical decision model and a structured methodology for sustainability appraisal in infrastructure projects in a developing country like South Africa. The research was conducted using a combination of structured interviews with industry professionals, case study project data, existing government guidelines on environmental impact assessments and sustainable construction environment, literature on sustainability research, and question naire based survey for indicator validation. It is used the .weighted sum model. Technique in multi-criteria decision analysis (MCDA) and the .additive utility model. In analytical hierarchical process (AHP) for multi-criteria decision.

Dissanayaka and Kumaraswamy (1999) developed a comprehensive model to incorporate all significant procurement sub-systems variables with non procurement variables based on time and cost performance. The multiple regression technique was applied to analyze the data from 32 Hong-Kong building projects and the results were compared with reality. Lehtonen (2001) proposed new framework for measuring construction logistics. Two-dimensional model are grouped by the use of measures and by the focus of measures. The first dimension (use of measures) contains two kinds of measures. One of them is called improvement measures and the other kind is called monitoring measures. The second dimension of the framework is the focus of measures. It clarifies at which organizational level measures can be used.

2002; Kuprenas, 2003; Cheung, 2004; Iyer and Jha, 2005; Navon, 2005; Love et al, 2005; Ugwa and Haupt, 2007) to identify the factors affecting the performance of construction projects. In addition, there are other local factors that have been added as recommended by local experts such as escalation of material prices, differentiation of shilling prices against the dollar, average delay because of closures and material shortage, neighbors and site condition problems, belonging to work and location of project. 63 factors affecting performance of construction projects are selected. These factors are grouped into 10 groups based on literature review. These groups can give a comprehensive summary of the main key performance indicators. The factors, which are considered in the questionnaire, are summarized and collected according to previous studies and other factors are added as recommended by local experts as shown in Table 3.1.

(Omar Osman, 2006). The success of a project is a very critical issue in the industry. Research has been vigorously done on successful projects in the hopes to discover the factors that contribute towards achieving project success. Sayles and Chandler (1971) have listed five critical success factors for construction projects, which are namely, the efficiency of the project manager, the appropriate scheduling of activities, a systematic responsibility and monitoring approach, project supervision and finally continuous project involvement. Martin (1976) on the other hand has identified eight success factors of a project, entailing comprehension of objective, the organizational philosophy, management support, apt job delegation and scope, selection of project team members, sufficient allocation of resources, a practical information mechanism and a review of project planning.

Morris and Hough (1987) through their study have come up with nine project success factors. These factors include a clear project objective, innovativeness towards technological change, community participation, priority based scheduling, finance, legal requisites, contractual ties and problem solving. It is clear that there are numerous factors that can be attributed to project success with a few factors that are mutually emphasized by various researches. These common factors are task and activity scheduling as well as the clear comprehension of a project's objectives. What this study intends to do is to extend these factors to include a vital cog in the implementation of any construction project, i.e., the project manager.

Fryer (1985) has listed skills that a project manager should possess in influencing the success of project, namely skills pertaining to social interaction, decision-making, problem handling, adeptness in identifying opportunities and the ability to adopt managerial change. But the fact remains, a majority of projects still report poor performance even with the presence of capable project manager. This leads to the notion that individual capacity and inherent skills of the project manager alone is insufficient to guarantee project success.

The differentiation of directions and goals of topic as shown previously, required different methodologies. The main methodologies obtained from literature review were: The following topics show summary of the main studies related to performance and their methodologies. Finally, it is shown methodology which is used in this research.

*Conceptual Framework*

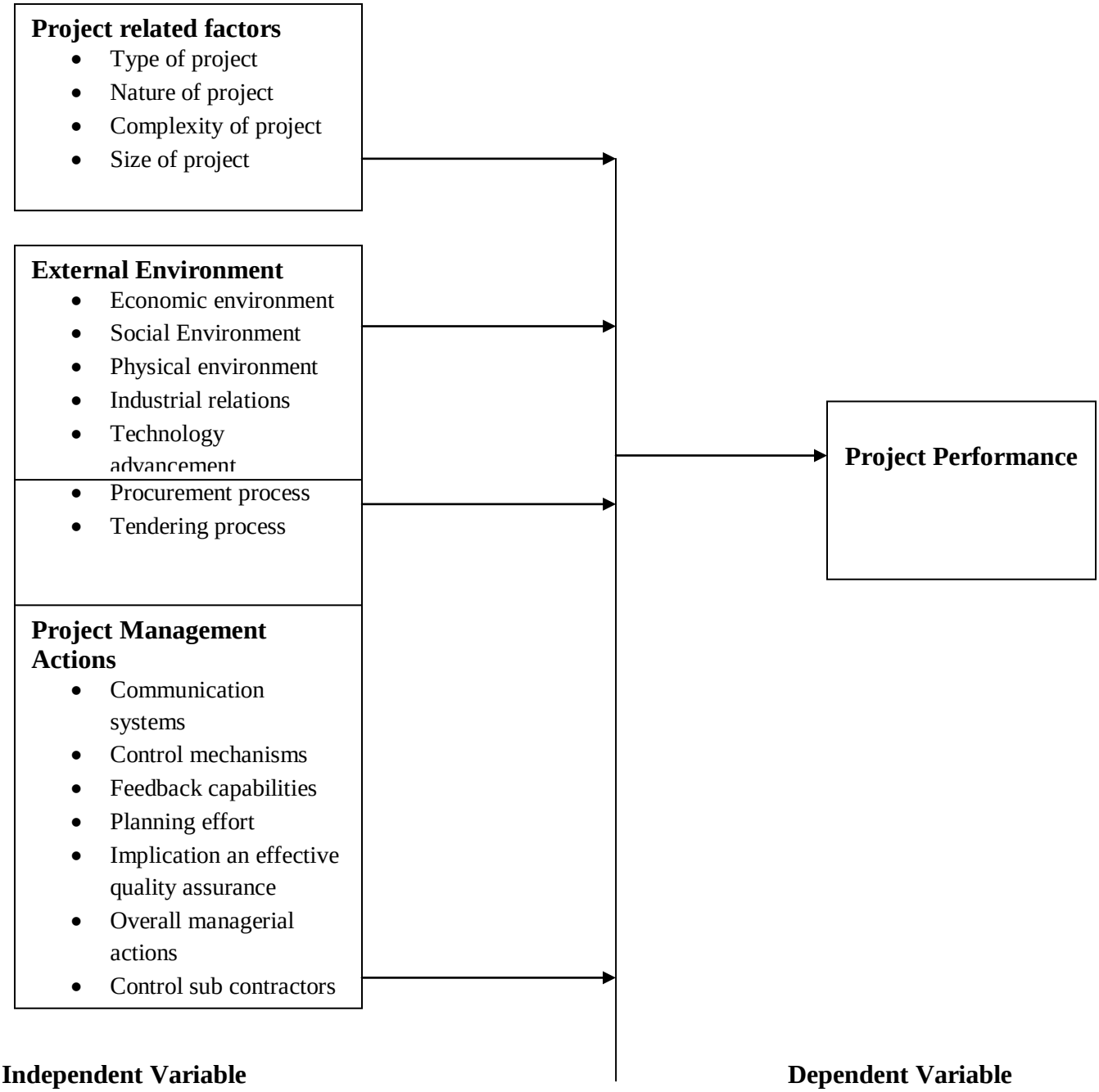


**Figure 2.2: Factors affecting performance of construction project.**

A new conceptual framework that includes and regroups the identified variables affecting project performance will be developed. It can be used as a base for further detailed investigation on general construction projects, as well as a specific project, such as hospital or hotel. A more systematic way of determining project performance is established. This paper focuses on the CSFs and not on the measurement of project success, i.e., the key performance indicators~KPIs Further study should be directed to identify the KPIs, so that the causal relationships between CSFs and KPIs can be identified. The causal relationships, once identified, will be a useful piece of information to implement a project successfully. It can help in selecting project team members, identifying the development needs of the project team members, and most important for forecasting the performance level of a construction project before it commences

**Project Related Factors**

Project-Related Factors

A general description of success factors is defined as personal characteristics that is necessary to perform the job, such as knowledge, skills and attitude (Nguyen et al., 2004). Lim and Mohamed (1999) define a factor as any circumstance, fact, or influence which contribute to a result" and further describe factors for project success as influential forces which either facilitate or impede project success. While success criteria is the set of conditions necessary to make a judgment of project success, success factors are something that contribute to the project success (Lim and Mohamed, 1999). The relation between success factors, success criteria and project success described by Lim and Mohamed. In a like manner as Pinto and Prescott (1988), Lim and Mohamed suggest that there are sets of factors relevant for each phase of the project life cycle. From the macro viewpoint of success, the conceptual and operational phases form the basis for success factors. Since, it is in these phases that the project gets conceptualized and tested. From the micro point of view, it is the construction phase and the contractual parties' goals as time, cost, quality and safety that form the basis (Lim and Mohamed, 1999)

**External Environment that Influence Performance**

Walker and Vines 2000). further described ''environment'' as all external influences on the construction process, including social, political, and technical systems. The attributes used to measure this factor are economic environment, social environment, political environment, physical environment, industrial relation environment, and level of technology advanced

***External Factors***

Various researchers support ''environment'' as a factor affecting the project success (Walker and Vines 2000). further described ''environment'' as all external influences on the construction process, including social, political, and technical systems. The attributes used to measure this factor are economic environment, social environment, political environment, physical environment, industrial relation environment, and level of technology advanced. Development needs of the project team members, and most important for forecasting the performance level of a construction project before it commences.

According to a research done by Mustapha and Noaum (1997), there are basically five main categories of factors that will influence or affect the overall performance of a project manager. These five categories are as follows:

Factors related to individual and personal characteristics
Factors related to work conditions
Factors pertaining to nature of the project and its characteristics
Factors concerning the environment
Organizational factors

For the purpose of this study, focus will be given towards the factors of work conditions, nature of project and organizational factors. The second group of factors concerning the nature of project consists of variables pertaining to project environment, project size, available project duration, project complexity, project team relationships as well as materials and resources. Factors within the organization are made up of variables concerning company size, level of power/authority and type of client.

**Project Procedures**

**Procurement Related Factors that Influence Project Performance**

A number of researchers identified the importance of procurement factors(Walker and Vines 2000). defined the scope of procurement as the framework within which construction is brought about, acquired or obtained. Therefore, two attributes are used to measure this factor; they are procurement method (selection of the organization for the design and construction of the project) and tendering method (procedures adopted for the selection of the project team and in particular the main contract
Previous studies of Rasid (2006), Eriksson and Westerberg (2009) and Eriksson and Vennstrom (2009) suggest different procurement related factors that can affect project performance. These studies considered different procurement related factors without an area of commonalities. reconstruction time, control of project design and cost and client's control of construction projects are procurement related factors whose influences were found on procurement methods of Traditional, Design and Build and Management Contracting in Malaysia construction industry. Studies of Rasid (2006) also in Malaysia concentrated on allocation of responsibilities, activities sequencing, process and procedure and organizational approach as procurement related factors that affect project performance. Eriksson and Westerberg (2012) indicates important procurement related factors considered at the design stage as bid invitation, bid evaluation, subcontracting. Subcontracting selection, compensation factors and performance evaluation which were termed collaborative procurement procedures were found to have effects on project performance. Eriksson and Vennstrom (2012) also postulate that cooperative procurement procedures of joint specification, limited bid invitation, soft evaluation parameters, joint sub-contractor selection, incentives, collaborative tools, contractor self control and collaboration on project all have various effects on project performance. Procurement related factors identified from these previous studies are also related to selection criteria, tendering methods and variation orders that are considered in this study. Some of these procurement related factors are in ambit of what has been considered in previous studies and hence they are discussed as follows:

**Procurement Selection criteria**

Different authors have postulated different procurement selection factors that can assist clients to choose the best procurement method. Studies of Masterman and Gameson (1994), Rowlinson (1999), Alhazini and McCaffer (2000), Shiyamni (2006) as cited in Soyombo and Ogunsanmi (2011) have demonstrated that procurement selection factors of client characteristics, project requirements and external environment are in use. However, Shiyamni (2006) re-emphasized the use of the three factors together but expansively considers client requirements to include cost related factors, time related factors and quality related factors. Several variables of client

requirements were measured under cost, time and quality related factors. Project characteristics factors also include project type, size, cost, flexibility, complexity, site risk factors and degree of innovative technology. External environment factors considered are market competitiveness, availability of materials, natural disasters, industrial actions amongst other variables. Client characteristics, project requirements and external factors are considered with general needs for investigating the procurement related factors that affect project performance in this study. Cost related factors of capital cost of the project, maintenance cost, prequalification cost, financial risk amongst other variables can influence a client to select a particular procurement method that meets all these client requirements. Time related factors of planning and design time, construction time, early start of project, speed of construction and time overrun can help client to select an appropriate procurement method. Quality related factors of design reliability, aesthetic appearance of the building, workmanship amongst other variables are considered in this study. General needs factors of involvement of parties, their transparency, accountability, safety requirements and flexibility of the procurement process to client charges are also considered in the study. Project characteristics factors considered in this study are project type, size, cost, degree of flexibility, complexity, time constraints, payment method, finding methods and innovative technology. Moreover, external environment factors considered also include nature of the market, government policies, government as major client, regulating feasibility, technology feasibility amongst other variables. All these above factors can influence the selection of an appropriate procurement method that can also affect project performance.

**Tendering Method Related Factors**

Tendering is the administrative procedure of sending out drawings and bill of quantities or specification to contractors with the intention to submit a price for the construction of the project.

Besides the price for this project other consideration such as contractor's competence,financial capability, technical competence and other factors are used in selecting a contractor for executing a construction project. Different tendering methods have been used in construction projects for inviting tenders. According to Ramus (1981), Manthosi and Thawala (2012) and Ganderton (2012) there are various methods such as open selective, negotiation, competitive, openselective, design and build tendering approaches that have been used in construction projects. In addition, serial and two-stage tendering methods have been significantly used also in construction projects. According to Mathonsi and Thawala (2012) the use of open tendering method involves placing an advertisement in a widely read newspaper to invite prospective contractors to tender and it is strongly criticized for its increased cost of processing. Selective tendering in the views of Ramus (1981) involves considering 5-8 competent contractors to be invited to tender for a project. Criteria used in drawing up these competent contractors can include standard of workmanship required, equipment base of the firm, previous business records and financial standing amongst other factors. Selection of contractor through this approach may overcome the deficiencies in open tendering but may lead to higher quotations. Negotiation approach is used when a firm or client has previous satisfaction association with a contractor and the client is prepared to give the contract to this contractor on bases of reasonable price for the project. Such an arrangement is also used if the project is of specialist nature. This approach is known to save time but may lead to higher prices for the quotation (Ramus, 1981; Ganderton, 2012). Competitive tendering approach is used where various contractors of all categories are welcomed to submit tenders. According to Chinyio (2011) competitive tendering must have three stages of pre-qualification, tender documentation and bidding.

As indicated by Public Procurement Act (2007) competitive tendering in Nigeria is to encourage due process, accountability and transparency but this involves high bidding cost, conflicts of interest as it is not guaranteed that the lowest tender wins the project. Open-selective tendering approach is used as a hybrid of open and selective methods. The Traditional procurement method utilizes open, selective and negotiated tendering approaches to obtain its tenders (Mathonsi and Thawala, 2012). Design and build procurement method utilizes selective tendering method for obtaining tenders from Design-build contractors. According to Chinyio (2011) selective tendering method can be sub-divided into single stage and two-stage tendering methods. Single stage tendering is an approach where one stage of tendering is used while a two-stage tendering method involves a two-stage process of competitive selection of contractor on basis of price and negotiation of contract details and firm price with the contractor appointed at the first stage. On the first stage contractors will be assessed on basis of construction programmes, method statements, pricing of preliminaries, overheads and profits. In the second stage negotiation between the client and the contractor on price is undertaken. If agreed it becomes the contract price (Chinyio, 2011). This approach is advantageous in that it facilitates early appointment of a contractor and it combines strengths of competition and negotiation while its disadvantage is that the preferred contractor may fail to negotiate for the competitive price and negotiation may drag-on and compound the complexity of the process. All these discussed tendering approaches in this section are exploited for this study. Tendering approaches that are used for selecting a contractor for a project can affect project performance. If the tendering procedure used is such that focuses on low tender price, this may result in increased risk of cost overrun on the project due to high cost of variation orders (Assaf and Al-Heiji, 2006). As stretched by Iyer and Jha (2005) as cited in Soyombo and Ogunsanmi (2011) there is a need to be careful of contractor selection on projects as to reduce cost growths.

**Project Management Actions**

Project management action is a key for project success (Hubbard 1990). Jaselskis and Ashley (1991) suggested that by using the management tools, the project managers would be able to plan and execute their construction projects to maximize the project's chances of success. Then, the variables in project management include adequate communication, control mechanisms, feedback capabilities, troubleshooting, coordination effectiveness, decision making effectiveness, monitoring, project organization structure, plan and schedule followed, and related previous management experience (Walker and Vines 2000)

A project can be characterized by a few elements such as objectivity as it is definable with result, output or product, complexity with normally interrelated activities and large number of different tasks, unique where it is usually a "one-off" assignment, uncertainty as it has element of risk, temporary with its well defined beginning and end and lastly operate in a life cycle as emphasis and resource needs change during the life of the project. In contrary, project management is defined as the process of controlling the achievement of the project objectives, using the existing organizational structures and resources and manage the project by applying a collection of tools and techniques without interrupting the routine operation of a company (Munns & Bjeirmi, 1996). Some of the functions of project management are defining the work requirement, allocating resource needs, planning the execution of work required, monitoring the progress of the work and taking action to unexpected events that took place (Munns & Bjerimi, 1996).
According to Kerzner (2009), most individuals recognize the quantitative tools for planning, scheduling, and controlling work. It is essential that project managers comprehend completely the operations of each department. The only way to minimize risk is for organizations to plan better. Since organizations now exist in turbulent environment where competition, uncertainty and unprecedented complexity of new task has become the order of the day, One will unarguable recommend project management as one of the best methodology to foster better planning. These have become one of the reasons why more organizations are integrating project management as a way of life in their endeavor.

Nevertheless, Jeffrey K. Pinto (2010) in his publication motivated that, Project management is one of most prevalent tools for attaining competitive advantage over rivals in public and private business, use to improve internal operations, react quickly to external opportunities, achieve technological innovations, and more significantly robustly cope with the challenges arising from various business acumen. Project management serves as a brilliant technical tool to train future executives in most entities such as budget selection, resource allocation, planning, scheduling and fast tracking their project.
A number of attributes will affect this factor, including the communication system, control mechanism, feedback capabilities, planning effort, organization structure, safety and quality assurance program, control of subcontractors' works, and finally the overall managerial actions.

**Problem of Performance in Construction Industry**

The failure of any construction project is mainly related to the problems and failure in performance. Moreover, there are many reasons and factors which attribute to such problem. Ogunlana et al, (1996) stated that the construction industry performance problems in developing economies can be classified in three layers: problems of shortages or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and consultants and problems caused by contractor incompetence/inadequacies. Okuwoga (1998) identified that the performance problem is related to poor budgetary and time control. Long et al (2004) remarked that performance problems arise in large construction projects due to many reasons such as: incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Navon (2005) state that the main performance problem can be divided into two groups: (a) unrealistic target setting (i.e., planning) or (b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources).

Samson and Lema (2002) found that the traditional performance measurement systems have problems because of large and complex amount of information with absence of approaches to assist decision maker understand, organize and use such information to manage organizational performance. Navon (2005) remarked that traditional project performance control is usually generic (e.g., cost control techniques). It relies on manual data collection, which means that it is done at low frequency (normally once a month) and quite some time after the controlled event occurred (i.e., not in real-time). Moreover, manual data collection normally gives low quality data.

Ling et al (2007) remarked that architectural, engineering and construction (AEC) firms may face difficulties managing construction projects performance in China because they are unfamiliar with this new operating environment. Kim et al (2008) stated that international construction projects performance is affected by more complex and dynamic factors than domestic projects; frequently being exposed to serious external uncertainties such as political, economical, social, and cultural risks, as well as internal risks from within the project.

**Construction Management and Performance**

There is a strong relation between project management and project performance. Management in construction industry is considered as one of the most important factors affecting performance of works. Brown and Adams (2000) studied a new approach to the measurement of the effect of Building Project Management (BPM) on time, cost and quality outputs using 15 `cases' derived from UK data. The evaluation undertaken demonstrates that BPM as it is presently implemented in the UK fails to perform as expected in relation to the three predominant performance evaluation criteria; time, cost and quality. Lehtonen (2001) obtained a model for performance measurement which assist both firms' top management and operational managers for continuous feedback on operational activities. Thomas (2002) stated that documenting and archiving performance data could be useful for future reference, such as for settling disputes on claims, and in maintenance and repair works. Kuprenas (2003) remarked that quantification of the impacts of the project management processes are identified through three steps of analysis: comparison of summary statistics of design performance, proof of statistical significance of any differences and calculation of a least squares regression line of a plot of design performance measurement versus amount/application of project management as a means to quantify management influence to design phase cost performance.

Cheung et al (2004) studied the project performance related to project managers. It is remarked that development of a Web-based construction Project Performance Monitoring System (PPMS) can assist project managers in exercising construction project performance indicators and can help senior project management, project directors, project managers, etc., in monitoring and assessing project performance. Pheng and Chuan

(2006) stated that while project management is only one of the many criteria upon which project performance is contingent, it is also arguably the most significant as people formulating the processes and systems who deliver the projects. Ugwu and Haupt (2007) stated that an adequate understanding and knowledge of performance are desirable for archiving managerial goals such as improvement of institutional transformations, and efficient decision making in design, specification and construction, at various project-level interfaces, using appropriate decision-support tools. Ling et al (2007) investigated project management (PM) practices adopted by Singaporean construction firms. It was determined the performance level of their projects in China; identifies PM practices that led to better performance; and recommended key PM practices that could be adopted by foreign construction firms in China to improve project performance.

**Construction Projects and Performance**

Success of construction projects depends mainly on success of performance. Many previous researches had been studied performance of construction projects. Dissanayaka and Kumaraswamy (1999) remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. Reichelt and Lyneis (1999) remarked three important structures underlying the dynamic of a project performance which are: the work accomplishment structure, feedback effects on productivity and work quality and effects from upstream phases to downstream phases. Thomas (2002) identified the main performance criteria of construction projects as financial stability, progress of work, standard of quality, health and safety, resources, relationship with clients, relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting. Chan and Kumaraswamy (2002) stated that construction time is increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization.

Cheung et al (2004) identified project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction, and communication. It is obtained by Navon (2005) that a control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators (PPI) is needed. Pheng and Chuan (2006) obtained that human factors played an important role in determining the performance of a project. Ugwu and Haupt (2007) remarked that both early contractor involvement (ECI) and early supplier involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc. Ling et al (2007) obtained that the most important of practices relating to scope management are controlling the quality of the contract document, quality of response to perceived variations and extent of changes to the contract. It was recommended for foreign firms to adopt some of the project management practices highlighted to help them to achieve better project performance in China.

**Factors Affecting Performance of Managers**

Ogunlana et al, (1996) recommended the need for focused effort by economy managers and construction industry associations to provide the infrastructure needed for efficient project management and performance. Chan and Kumaraswamy (2002) remarked that effective communication and fast information transfer between managers and participants help to accelerate the building construction process and performance. Kuprenas (2003) studied the impact of the use of a project management based organizational structure, project manager training, frequency of design meetings, and frequency of design reports on design phase cost performance. The process of a design team meeting frequency and the process of written reporting of design phase progress were found to be statistically significant in reducing design phase costs.

Navon (2005) stated that data are collected and used for construction managers as a basis to evaluate the project performance indicator's (PPI) actual value to compare it with the planned value and forecast its future value based on past performance. Pheng and Chuan (2006) identified the importance of the working environment variables for the performance of a project manager in the private and public sectors according to three main groups which are job condition, project characteristic and organizational related categories. The result revealed that working hours, physical condition of project site, complexity of project, material and supplies, project size, duration of project and time availability were viewed differently in terms of importance by the contractors and consultants groups. Team relationship was ranked as the most important variable affecting the performance of a project manager. It is obtained that project managers experiences do not have much effect on how they perceive their working environment.

**Measurement of Project Performance**

Brown and Adams (2000) obtained an evaluation framework to measure the efficiency of building project management (BPM) by using conventional economic analysis tools such as time, cost and quality. Lehtonen (2001) stated that performance measurement systems are imminent in the construction firms. Samson and Lema (2002) stated that effective and efficient management of contractors' organizational performance requires commitment to effective performance measurement in order to evaluate, control, and improve performance today and in the future.

Tangen (2004) obtained that performance measurement is a complex issue that normally incorporates at least three different disciplines: economics, management and accounting. Measurement of performance has garnered significant interest recently among both academics and practitioners. Tangen (2004) remarked the choice of a suitable measurement technique depends on a number of factors, including the purpose of the measurement; the level of detail required; the time available for the measurement; the existence of available predetermined data; and the cost of measurement.

Navon (2005) defined performance measurement as a comparison between the desired and the actual performances. For example, when a deviation is detected, the construction management analyzes the reasons for it. The reasons for deviation can be schematically divided into two groups:

(a) unrealistic target setting (i.e., planning) or

(b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources).

Navon (2005) stated that performance measurement is needed not only to control current projects but also to update the historic database. Such updates enable better planning of future projects in terms of costs, schedules, labor allocation, etc. Pheng and Chuan (2006) stated that the measurement of project performance can no longer be restricted to the traditional criteria, which consist of time, cost and quality. There are other measurement criteria such as project management and products.

Cheung et al (2004) stated that New South Wales Public Works Department in Australia launched a Project Performance Evaluation (PPE) framework, which covers a wide range of performance parameters. PPE parameters are communication, time, cost, quality, safety, claims and issues resolution, environment, contract relations. The main purpose of PPE is to extend project performance measures to cover soft parameters also, such as communication and dispute resolution. In the UK, a project performance measurement tool referred to as the Key Performance Indicators (KPIs) was developed by the KPI working group under the UK Construction Industry Best Practice Programme to include time, cost, quality, client satisfaction, change orders, business performance, health and safety. The three major steps in implementing KPIs are as follows: Decide what to measure, Collect data and Calculate the KPIs. However, both the PPE and KPIs are valuable tools for measuring project performance over a period of time. Anyway, it is obtained from previous study that both methods PPE and KPIs can be used for measuring of performance as the indicators are similar in two methods. In this study KPIs method will be used to measure performance.

Iyer and Jha (2005) stated that measuring the performance of any construction project is a very complex process because modern construction projects are generally multidisciplinary in nature and they involve participation of designers, contractors, subcontractors, specialists, construction managers, and consultants. With the increasing size of the project, number of participants in the project also increases. The objectives or goals of all participants need not be same even in a given project. Hence to measure performance of a project without specifying the participant and without specifying the criteria for judging the performance holds no meaning. Past researchers have employed different criteria such as compliance to schedule, cost and quality to judge the project performance.

Lehtonen (2001) proposed new framework for measuring construction logistics by using two-dimensions in order to improve productivity. The first dimension (use of measures) contains two kinds of measures. One of these kinds is called improvement measures which help construction industry to find out the problems with current practices. These measures are mainly used during development projects. Another kind is called monitoring measures which are used for continuous monitoring of operations. The second dimension of the framework is the focus of measures. It clarifies at which organizational level measures can be used. There should be information available at the company and project level, as well as at the specific supplier or subcontractor level.

Samson and Lema (2002) proposed performance measurement system. The system comprises of construction business perspective including innovation and learning, processes, project, stakeholders, and financial perspective. The indicators developed from perspectives are categorized into three main groups which are drivers' indicators, process indicators and results indicators. The key to the success or failure of the measurement system are leadership commitment; employees' involvement and empowerment; and information coordination and management. Shen et al (2005) presented a method for measuring the environmental performance of construction activities committed by a contractor through calculating the contractor.s environmental performance score (EPS). The level of EPS serves as a simple indicator for measuring and communicating the level of a contractor environmental performance.

Cost performance can be measured through a cost performance index (CPI) computed
as (Kuprenas, 2003):

CPI=BCWP/ACWP
Where:
BCWP = budgeted cost of the work performed
ACWP = actual cost of the work performed.

From previous equation:
If CPI value of one means, the cost was as planned (at the budget Value)
If CPI value above one means, the project was below its budget
If CPI of less than one means, the project exceeded its budget.
Based on previous equation, time performance is measured through a schedule
performance index (SPI) computed as:
SPI=BCWP/BCWS
Where:
BCWP = budgeted cost of the work performed
BCWS = budgeted cost of the work scheduled.

From previous equation:
If SPI value of one means, the time was as planned (at the time Value)
If SPI value above one means, the project was ahead of schedule
If SPI of less than one means, the project was behind schedule

**Key Performance Indicators**

Samson and Lema (2002) remarked that characteristics of emerging performance measurement indicators need analysis of both the organization and environment such as: nature of work, global competition, quality awards, organizational role, external demands and power of IT. The indicators should be able to identify causes of problems, address all possible performance drivers, and identify potential opportunities for improvement. Stewart and Mohamed (2003) emphasized the importance of a structured evaluation framework to evaluate the value IT adds to the process of project information management. The framework is in the form of a Construct IT. with IT performance perspectives and indicators developed specifically for managing information on construction projects. Therefore, construction

organizations should lay the foundations for an IT performance measurement and management culture, by actively seeking to quantify the value IT generates.

Cheung et al (2004) remarked seven main key indicators for performance which are: time, cost, quality, client satisfaction, client changes, business performance, and safety and health. Navon (2005) stated that a number of research efforts to fully automate project performance control of various project performance indicators have been carried out in recent years. These are also briefly described together with the concept of measuring indirect parameters and converting them into the sought indicators. These are (1) labor and earthmoving productivity based on measuring the location of workers or earthmoving equipment at regular time intervals; (2) progress based on the above data; (3) a comprehensive control of construction materials starting by monitoring orders and purchasing up to the movement of the materials on site.

Pheng and Chuan (2006) stated that project performance can be determined by two common sets of indicators. The first set is related to the owner, users, stakeholders and the general public which are the groups of people who will look at project performance from the macro viewpoint. The second are the developer, a non-operator, and the contractor which are the groups of people who will look at project performance from the micro viewpoint. Jin et al (2006) studied the relationship-based factors that affect performance of general building projects in China. Thirteen performance metrics was used to measure the success level of construction projects. These factors were categorized into four groups namely cost, schedule, quality and relationship performance. It was recommended that foreign firms that have entered or are going to enter the Chinese construction industry should learn how to build cooperative and harmonious relationships with Chinese partners and finally achieve satisfactory project performance by paying sufficient attention to the aforementioned factors.

Ugwu and Haupt (2007) developed and validated key performance indicators (KPI) for sustainability appraisal using South Africa as a case study. It is used four main levels in a questionnaire to identify the relative importance of KPI. The main indicators were: economy, environment, society, resource utilization, health and safety and project management and administration. Luu et al (2007) provided nine key performance indicators (KPIs) which can be applied to measure project management performance PMP and evaluate potential contractors as well as their capacity by requesting these indices.

**Project Success and Project Performance**

Al-Momani (2000) stated that the success of any project is related to two important features, which are service quality in construction delivered by contractors and the project owner's expectations. Managing the construction so that all the participants perceive equity of benefits can be crucial to project success. It is obtained that the complete lack of attention devoted to owner's satisfaction contributes to poor performance. Declining market shares, low efficiency and productivity, and the rapid construction cost escalation also lead to poor performance. Nitithamyong et al (2004) remarked that the success of construction projects depends up on technology, process, people, procurement, legal issues, and knowledge management which must be considered equally.

Pheng and Chuan (2006) defined project success as the completion of a project within acceptable time, cost and quality and achieving client's satisfaction. Project success can be achieved through the good performance of indicators of the project. So, success refers to project success and performance refers to performance of indicators such as project managers. Wang and Huang (2006) stated that Project success has been widely discussed in the project management (PM) literature. The focus of most studies of project success is on dimensions of project success (how to measure it) and factors influencing project success. Wang and Huang (2006) studied that how the engineers evaluate project success and to what extent key project stakeholders' performance correlates with project success. It is obtained that project owners play the most important role in determining project success, and project management organizations' performance as the single point of project responsibility

## III. METHODOLOGY

Iyer and Jha (2005) studied that the factors affecting cost performance by considering a questionnaire survey approach. Love et al (2005) examined project time-cost performance relationships by using project scope factors for 161 construction projects that were completed in various Australian States and using multiple regression technique of weighted lest squares. Ugwu and Haupt (2007) studied the key performance indicators and proposed an analytical decision model and a structured methodology for sustainability appraisal in infrastructure projects in a developing country like South Africa. The research was conducted using a combination of structured interviews with industry professionals, case study project data, existing government guidelines on environmental impact assessments and sustainable construction environment, literature on sustainability research, and questionnairebased survey for indicator validation. It is used the weighted sum model. Technique in multi-criteria decision analysis (MCDA) and the .additive utility model. In analytical hierarchical process (AHP) for multi- criteria decision.

Samson and Lema (2002) proposed performance measurement system as a model based on literature review. The system comprises of construction business perspective including innovation and learning, processes, project, stakeholders, and financial perspective. It was proposed a questionnaire including set of indicators affecting project performance. Cheung et al (2004) obtained framework software to monitor and measure project performance based on project performance measurement system (PPMS). Project performance factors were identified as a questionnaire for inclusion in the PPMS. The monitoring process is automated through the use of the World Wide Web (WWW) and database technology. Data collection and dissemination are similarly automated. The system contains four stages which are data entry, database, reporting and action. This system had eight indicators to measure performance which are people, cost, time, quality, safety and health, environment, client Satisfaction, and communication. Navon (2005) presented automated project performance control system (APPC) for measurement of the project performance indicators (PPI). The approach used for

automated PPI measurement is that the values of some indirect parameters are measured automatically and converted into the sought value of the PPI by special algorithms.

**Research Design**

According to Ghauri and Grønhaug (2005), a research design is the overall plan for relating the conceptual research problem to relevant and practicable empirical research. In order words, the research design provided a plan or framework for data collection and its analysis. The aim for a researcher was give as a correct picture of reality as possible by combining and analysing empirical data in relation to theory. Different approaches exist and the approach most suitable for the research depends on the desired starting point of the researcher in relation to present theories.

For this study it adopted a cross sectional survey design questionnaire survey, interviewing, case studies and modeling. Since the research study is meant to test rather than generate theory, it adopted a quantitative approach which focused on describing and drawing inferences from the findings on the relationships between construction project performance, local factors affecting performance, Project related factors, external environmental factors, project procedure factors and project management actions Correlation and Regression approaches was used to investigate the relationships between the variables and the extent to which the independent variables explained effects of project performance.

**Study Population**

The targeted population for the study were Consultants, Contractors and Owners of construction projects within the Coastal region members from the construction industry sector in Coastal Kenya. The sample was project leaders and members from construction firms in Coast, Kenya. This is due to the readily availability of construction firms in Coastal region of Kenya and due to the element of time constraints, about a total population of 4230 with the breakdown of its composition as shown in table 3.1 below.

**Sampling Procedure and Target Sample Size**

A sample the representative part of the total population chosen for analysis during a research (Bryman and Bell, 2007). The importance of the sampling process was crucial. The characteristic of the interest sample of the population were Consultants, Contractors and Owners of construction projects. Hence the sample size was purposively and conveniently distributed among the sample frame as shown in table 3.1, based upon those who are directly or directly involved in projects and have expertise in that field.

The unit of analysis will comprise of the Construction projects. Simple random sampling method was used. The study used an interview guide of cross sectional survey, questionnaire survey, interviewing, case studies and modeling as the data collection tool to collect views on the factors affecting Construction Projects performance at the Coastal region of Kenya.

This research study collected a sample size of about 180 using purposive sampling as the targeted sample needed to have an exposure to project management. A questionnaire was used to collect feedback from the potential respondents. The questionnaire was divided into 3 sections. The first section is aimed to collect personal details and organization information, followed by second section which aimed to assess in the respondents' experience in project management. The third section aimed to investigate the criteria used in measuring the project success and followed by the most important section which aims to find out what the factors that influence the success implementation of a project, which has been adopted from Pinto's Project management Profile (PIP). The last section was to identify if project life cycle act as a moderating variable to project success.

Sample size of 180 will be taken from the total list of workers made up of Executive directors/managers, Senior Staff, owners as shown in table 3.1 and conforms to the advice for statistical analyses, stating that the number 30 is useful rule of thumb when deciding on a suitable sample size (Stutely, 2003). Also this sample size was chosen due the sampling technique chosen which was mainly purposive and by convenient and targeted workers who are directly or indirectly involved in projects and have knowledge and expertise in the area of the study.

| Sample Frame | Population size | Sample Frame |
|---|---|---|
| Executive Directors Managers | 30 | 9 |
| Senior Staff | 600 | 78 |
| Owners | 3000 | 93 |
| Total | 4230 | 180 |

Source: Author's Field Work.

**Data Processing, Analysis and Presentation**

After collecting the data using a pre-coded questionnaire, it was edited for inconsistencies.

Statistical package for social scientists (SPSS) version 21.0 was used for data entry and analysis. Correlation analysis tools i.e. the Pearson' correlation coefficient was used to establish the relationship between project performance in relation to project related factors, external environment, project related procedures and project management related actions. Multiple regression analysis was conducted to determine variance in the dependent variable that was explained by the independent variables because

there was more than one study variable affecting perceived project performance. The study findings have been presented in a report.

The multiple regression analysis was used to help estimate a linear equation of the form:

$$Y = a + b_1*X_1 + b_2*X_2 + ... + b_p*X_p$$

In this equation, the regression coefficients (or *B* coefficients) represented the *independent* contributions of each independent variable to the prediction of the dependent variable. Another i.e variable $X_1$ will be correlated with the *Y* variable, after controlling for all other independent variables.

## IV. RESULTS AND ANALYSIS

### Factors Affecting the Performance of Construction Projects

The results of this part of study provide an indication of the relative importance index and rank of factors affecting the performance of construction projects in the Coastal Region of Kenya.

**Table (4.6) The relative importance index (RII) and rank of factors affecting the performance of construction projects in the Coastal Region of Kenya according to each category.**

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **(1) Cost factors** | | | | | | |
| Profit rate of project | 0.709 | 24 | 0.791 | 13 | 0.754 | 23 |
| Overhead percentage of project | 0.662 | 26 | 0.702 | 30 | 0.677 | 29 |
| Project design cost | 0.515 | 40 | 0.703 | 29 | 0.597 | 40 |
| Material and equipment cost | 0.827 | 9 | 0.791 | 13 | 0..828 | 9 |
| Project labor cost | 0.756 | 19 | 0.759 | 15 | 0.754 | 22 |
| Project overtime cost | 0.603 | 37 | 0.615 | 36 | 0.622 | 36 |
| Motivation cost | 0.615 | 34 | 0.599 | 39 | 0.614 | 38 |
| Cost of rework | 0.603 | 36 | 0.687 | 38 | 0.602 | 39 |
| Cost of variation orders | 0.580 | 39 | 0.703 | 28 | 0.677 | 28 |
| Regular project budget update and cost control systems | 0.653 | 29 | 0.757 | 16 | 0.758 | 21 |
| Escalation of material prices | 0.862 | 5 | 0.847 | 6 | 0.904 | 20 |
| Differentiation of coins prices | 0.803 | 12 | 0.823 | 8 | 0.889 | 19 |
| **(2) Time factors** | | | | | | 18 |
| Planned time for project | 0.768 | 18 | 0.775 | 14 | 0.780 | 16 |
| Time needed to implement variation orders and Time needed to rectify defects | 0.659 | 28 | 0.672 | 32 | 0.639 | 33 |
| Average delay in claim approval and payment approval owner to contractor | 0.956 | 1 | 0.911 | 1 | 0.958 | 1 |
| Availability of resources as planned through project duration | 0.886 | 3 | 0.873 | 2 | 0.919 | 2 |
| **(3) Quality factors** | | | | | | |
| Conformance to specification | 0.897 | 2 | 0.823 | 7 | 0.837 | 8 |
| Availability of personals with high experience and qualification | 0.874 | 4 | 0.863 | 4 | 0.880 | 6 |
| Quality of equipments and raw materials in project | 0.850 | 7 | 0.855 | 5 | 0.876 | 7 |
| Participation of managerial levels with decision making | 0.827 | 9 | 0.799 | 11 | 0.815 | 13 |
| Quality assessment system in Organization and Quality training/meeting | 0.721 | 23 | 0.727 | | 0.758 | 18 |
| **(4) Productivity factors** | | | | | | |
| Project complexity | 0.744 | 22 | 0.727 | 21 | 0.776 | 17 |
| Number of new projects / year | 0.615 | 33 | 0.703 | 27 | 0.645 | 30 |
| Management-labor relationship | 0.791 | 14 | 0.703 | 26 | 0.758 | 19 |
| Absenteeism rate through project | 0.791 | 13 | 0.703 | 25 | 0.758 | 18 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Sequencing of work according to Schedule | 0.815 | 10 | 0.821 | 9 | 0.819 | 12 |
| **(5) Client Satisfaction factors** | | | | | | |
| Information coordination between owner and project parties | 0.744 | 21 | 0.807 | 10 | 0.824 | 12 |
| Leadership skills for project Manager /Owner | 0.850 | 6 | 0.863 | 4 | 0.919 | 3 |
| Number of disputes between owner and project parties | 0.768 | 17 | 0.743 | 18 | 0.735 | 24 |
| **(6) Regular and community satisfaction factors** | | | | | | |
| Cost of compliance to regulators owner and project parties owner and project parties | 0.615 | 33 | 0.663 | 34 | 0.619 | 37 |
| Number of non compliance to regulation | 0.650 | 30 | 0.639 | 35 | 0.629 | 34 |
| Quality and availability of regulator documentation | 0.662 | 27 | 0.751 | 17 | 0.668 | 30 |
| Neighbors and site conditions Problems | 0.803 | 11 | 0.727 | 20 | 0.725 | 25 |
| **(7) People factors** | | | | | | |
| Employee attitudes in project | 0.697 | 25 | 0.743 | 18 | 0.810 | 14 |
| Recruitment and competence development between employees | 0.768 | 17 | 0.703 | 24 | 0.824 | 10 |
| Employees motivation Belonging to work | 0.780 | 15 | 0.711 | 23 | 0.806 | 15 |
| **(8) Environment factors** | | | | | | |
| Air quality | 0.603 | 36 | 0.607 | 37 | 0.686 | 27 |
| Noise level | 0.580 | 38 | 0.527 | 40 | 0.628 | 35 |
| Wastes around the site | 0.650 | 30 | 0.599 | 39 | 0.664 | 31 |
| Climate condition in the site | 0.744 | 19 | 0.671 | 33 | 0.722 | 26 |

**Source: primary data**

The most important factors agreed by the owners, consultants and contractors as the main factors affecting the performance of construction projects in the Coastal Region of Kenya were: escalation of material prices; availability of resources as planned through project duration; average delay because of closures and materials shortage; availability of personals with high experience and qualification; quality of equipments and raw materials in project; and leadership skills for project manager.

**Table (4.7) the following factors are among the top significant factors affecting the performance of construction projects in the Coastal Region of Kenya for all parties**

| **Factors** | **Owner** | | **Consultant** | | **Contractor** | |
|---|---|---|---|---|---|---|
| | **RII** | **Rank** | **RII** | **Rank** | **RII** | **Rank** |
| Escalation of material prices | 0.862 | 5 | 0.847 | 6 | 0.904 | 4 |
| Availability of resources as planned through project duration | 0.886 | 3 | 0.873 | 2 | 0.919 | 2 |
| Availability of personals with high experience and qualification | 0.874 | 4 | 0.863 | 3 | 0.880 | 5 |
| Average delay in claim approval and payment approval owner to contractor | 0.956 | 1 | 0.911 | 1 | 0.958 | 1 |
| Quality of equipments and raw materials in project | 0.850 | 7 | 0.855 | 5 | 0.876 | 6 |
| Leadership skills for project Manager /Owner | 0.850 | 6 | 0.863 | 4 | 0.919 | 3 |

**Source: primary data**

According to owners, consultants and contractors; it was obtained that the Average delay in claim approval and payment approval owner to contractor results to closures and materials shortage was the most important performance factor as it has the

first rank among all factors with relative index (RII) = 0.956 for owners, 0.911 for consultants and 0.958 for contractors. This agreement between all target groups is traced to the cultural and political situation from which affects the Coastal Region of Kenya.

Construction projects in the Coastal Region of Kenya is suffering from a number of problems because of closures and materials shortage. These problems can be considered as an obstacle for time performance of projects as this impact on the rate at which projects are executed. All owners, consultants and contractors feel with such this sensitive problem in their projects.

Availability of resources as planned through project duration has been ranked by the owners' respondents in the third position with RII equal 0.886. It has been ranked by the consultants respondents in the second position with RII equal 0.873and has been ranked by the contractors respondents in the third position with RII equal 0.919. This factor can be considered as an important for three parties and it has a similar rank for all parties as it affects directly on project performance such as time. Availability of resources is related to closures. If resources are not available as planned through project duration, the project will suffers from problem of time and cost performance. Hence the schedule is not adhered to.This result is in line with Iyer and Jha (2005) as availability of resources as planned through project duration is an important factor for owners and contractors in Indian construction projects. This is because resource availability as planned schedule can improve time performance of projects.

Availability of personals with high experience and qualification has been ranked by the owners respondents in the fourth position with RII equal 0.874 It has been ranked by the consultants respondents in the third position with RII equal 0.863 and has been ranked by the contractors respondents in the sixth position with RII equal 0.876. This factor is more important for consultants than for others. Availability of personals with high experience and qualification lead to better performance of quality, time, cost, productivity and safety of projects. In the Coastal region of Kenya projects are awarded to the lowest bidder. Some of the lowest bidders may lack management skills and less attention is paid to contractor's plan, cost control, overall site management and resource allocation. Samson and Lema (2002), Cheung et al (2004) and Iyer and Jha (2005) are in agreement with our result as this factor is very important because it affects strongly on quality performance of construction projects.

Leadership skills for project manager has been ranked by the owners respondents in the seventh position with RII equal 0.850. It has been ranked by the consultants respondents in the third position with RII equal 0.863 and has been ranked by the contractors respondents in the second position with RII equal 0.919. This factor is considered as more important for contractors than for others. This is mainly because that if project manager has strong leadership skills, then the project performance can be monitored, controlled and managed with high quality. This result is in line with Iyer and Jha (2005) as this factor is more important for contractors than for owners because skills and quality of leadership affects strongly and directly on contractors performance through project. Escalation of material prices has been ranked by the owners respondents in the fifth position with RII equal 0.862. It has been ranked by the consultants respondents in the seventh position with RII equal 0.847 and has been ranked by the contractors respondents in the fourth position with RII equal 0.904. This factor is considered as more important for contractors than for others because escalation of material prices affects the cost performance of contractors.

It should be mentioned that there were many projects in the Coastal Region of Kenya finished with poor cost performance because of escalation of material prices. This is because of weakening of Kenyan shilling against the US dollar.

Quality of equipments and raw materials in project has been ranked by the owners respondents in the ninth position with RII equal 0.850. It has been ranked by the consultants respondents in the sixth position with RII equal 0.855 and has been ranked by the contractors respondents in the seventh position with RII equal 0.876. It is not surprising to obtain that this factor is more important for consultants than for others because that quality control is one of the most important duties for the consultant in the site of construction project. This will lead to owner satisfaction and implementation of project according to specifications. In the Coastal Region of Kenya, most of available materials are with little variation in quality and produced by a limited number of producers. Cheung et al (2004) and Iyer and Jha (2005) are in agreement with the result as this factor affects the project performance and the degree of owners satisfaction. Constant breakdowns of machines and equipments due to the aging factors affects the performance of work since most man hours are spent majorly in repairs of the same.

However, there are some factors which can be considered as more important for one party than for others as shown in the Table 4.6. This is because contractors are interested with operational and managerial factors such as productivity and material availability. Unlike contractors, however, the owners and consultants considered the client and technical factors to be more important than operational ones.

**Table 4.8 shows summary of factors ranking according to all categories: performance of construction projects in the Coastal Region of Kenya according to all categories**

| Factors | All Response | |
|---|---|---|
| | RII | Rank |
| Average delay in claim approval and payment approval owner to contractor | 0.942 | 1 |
| Availability of resources as planned through project duration | 0.893 | 2 |
| Leadership skills for project Manager /Owner | 0.877 | 3 |
| Availability of personals with high experience and qualification | 0.872 | 4 |
| Escalation of material prices | 0.871 | 5 |
| Quality of equipments and raw materials in project | 0.860 | 6 |

| | | |
|---|---|---|
| Conformance to specification | 0.852 | 7 |
| Differentiation of coins prices | 0.838 | 8 |
| Sequencing of work according to Schedule | 0.818 | 9 |
| Material and equipment cost | 0.815 | 10 |
| Participation of managerial levels with decision making | 0.814 | 11 |
| Information coordination between owner and project parties | 0.792 | 12 |
| Planned time for project | 0.774 | 13 |
| Employees motivation Belonging to work | 0.766 | 14 |
| Recruitment and competence development between employees | 0.765 | 15 |
| Project labor cost | 0.756 | 16 |
| Neighbors and site conditions Problems | 0.752 | 17 |
| Management-labor relationship | 0.751 | 18 |
| Absenteeism rate through project | 0.751 | 19 |
| Profit rate of project | 0.751 | 20 |
| Employee attitudes in project | 0.750 | 21 |
| Project complexity | 0.749 | 22 |
| Number of disputes between owner and project parties | 0.749 | 23 |
| Quality assessment system in Organization and Quality training/meeting | 0.735 | 24 |
| Regular project budget update and cost control systems | 0.723 | 25 |
| Climate condition in the site | 0.712 | 26 |
| Quality and availability of regulator documentation | 0.694 | 27 |
| Overhead percentage of project | 0.680 | 28 |
| Time needed to implement variation orders and Time needed to rectify defects | 0.657 | 29 |
| Number of new projects / year | 0.654 | 30 |
| Cost of variation orders | 0.653 | 31 |
| Number of non compliance to regulation | 0.639 | 32 |
| Wastes around the site | 0.638 | 33 |
| Cost of compliance to regulators owner and project parties owner and project parties | 0.632 | 34 |
| Air quality | 0.632 | 35 |
| Cost of rework | 0.631 | 36 |
| Project overtime cost | 0.613 | 37 |
| Motivation cost | 0.609 | 38 |
| Project design cost | 0.605 | 39 |
| Noise level | 0.578 | 40 |

**Source: primary data**

**Table (4.9) the following factors are among the top ten significant factors affecting the Performance of construction projects in the Coastal Region of Kenya according to all categories**

| **Factors** | **All Response** | |
|---|---|---|
| | **RII** | **Rank** |
| Average delay in claim approval and payment approval owner to contractor | 0.942 | 1 |
| Availability of resources as planned through project duration | 0.893 | 2 |
| Leadership skills for project Manager /Owner | 0.877 | 3 |
| Availability of personals with high experience and qualification | 0.872 | 4 |
| Escalation of material prices | 0.871 | 5 |
| Quality of equipments and raw materials in project | 0.860 | 6 |
| Conformance to specification | 0.852 | 7 |
| Differentiation of coins prices | 0.838 | 8 |
| Sequencing of work according to Schedule | 0.818 | 9 |
| Material and equipment cost | 0.815 | 10 |

**Source: primary data**

According to all response, average delay because of closures and materials shortage was the most important performance factor as it has the first rank among all factors with RII = 0.942. This importance is traced to the difficult political situation from which the Coastal Region of Kenya suffers. Construction projects in the Coastal Region of Kenya is suffering from complex problems because of closures and materials shortage. These problems can be considered as an obstacle for time

performance of projects. All owners, consultants and contractors feel with such this sensitive problem in their projects. Availability of resources as planned through project duration has been ranked by all response in the second position with RII equal 0.893. This factor is considered as an important for all parties as it affects directly on project performance such as time. If resources are not available as planned through project duration, the project will suffers from problem of time and cost performance. This result is in line with Iyer and Jha (2005) as availability of resources as planned through project duration is an important factor for all response in Indian construction projects. This is because resource availability as planned schedule can improve time performance of projects.

Leadership skills for project manager has been ranked by all response in the third position with RII equal 0.877. If project manager has strong leadership skills, the project performance can be monitored, controlled and managed with high quality. This result is in line with Iyer and Jha (2005) as skills and quality of leadership affects strongly and directly on performance of construction project. Availability of personals with high experience and qualification has been ranked by all response in the fourth position with RII equal 0.872. Escalation of material prices affects the cost performance of project. It was mentioned that there were many projects in the Coastal Region of Kenya

Escalation of material prices has been ranked by all response in the fifth position with RII equal 0.871. Availability of personals with high experience and qualification lead to better performance of quality, time, cost, productivity and safety of projects. In Coastal region, projects are awarded to the lowest bidder. Some of the lowest bidders may lack management skills and less attention is paid to contractor's plan, cost control, overall site management and resource allocation. Samson and Lema (2002), Cheung et al (2004) and Iyer and Jha (2005) are in agreement with the result findings as this factor is very important because it affects strongly on quality performance of construction projects.

Quality of equipments and raw materials in project has been ranked by all response in the sixth position with RII equal 0.860. Quality control is one of the most important duties for the consultant in the site of construction project. This will lead to owner satisfaction and implementation of project according to specifications. In the Coastal Region of Kenya, most of available materials are with little variation in quality and produced by a limited number of producers. Cheung et al (2004) and Iyer and Jha (2005) are in agreement with the result findings as this factor affects the project performance and the degree of owners satisfaction.

Weakening of the Kenyan Shilling against the US dollar has been ranked by all response in the eighth position with RII equal 0.838. This factor affects the liquidity, project budget and cost performance. Construction projects in the Coastal Region of Kenya have suffered from differentiation of coins prices because of difficult political and economical situation experienced in the country. Conformance to specification has been ranked by all response in the seventh position with RII equal 0.852. This factor is an important for owner's satisfaction. The owner usually seeks to implement project according to specification. Iyer and Jha (2005) are in agreement with the result as this factor is significant for owners because this factor is strongly related to client satisfaction.

Sequencing work according to schedule has also been ranked by all response in the ninth position with RII equal 0.818. This is mainly because cash flow affects the project budget and project cost performance. This result is in agreement with Samson and Lema (2002) because cash flow can give an important evaluation for the cost performance at any stage of project.

Material and equipment cost has been ranked by all response in the tenth position with RII equal 0.818. Cost performance of any project depends mainly on liquidity of organization. This result is in line with Samson and Lema (2002) as liquidity of organization is very important for evaluation of project budget and cost performance.

**Performance Categories**

Table 4.10 shows the ten categories which affect the performance of construction projects. Cost group has been ranked by the owners respondents in the seventh position with RII equal 0.682. It has been ranked by the consultants respondents in the fifth position with RII equal 0.731 and has been ranked by the contractors respondents in the sixth position with RII equal 0.723. This group is more important for consultant than for others because liquidity of organization and project design cost affect the project cost performance and this is related to owner satisfaction. Cheung et al (2004) are in line with our result as cost group affects strongly the performance of construction projects and it can be one of the most important indicators to measure performance. Iyer and Jha (2005) are in agreement with our result as cost is considered as an important criteria for judgment of construction projects performance.

**Table (4.10) the relative importance index (RII) and rank of major groups affecting the performance of construction projects in the Coastal Region of Kenya.**

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| (1) Cost factors | 0.682 | 7 | 0.731 | 5 | 0.723 | 6 |
| (2) Time factors | 0.817 | 2 | 0.808 | 2 | 0.824 | 3 |
| (3) Quality factors | 0.834 | 1 | 0.813 | 1 | 0.833 | 1 |
| (4) Productivity factors | 0751 | 5 | 0.731 | 4 | 0.751 | 5 |
| (5) Client Satisfaction factors | 0.787 | 3 | 0.804 | 3 | 0.826 | 2 |
| (6) Regular and community satisfaction factors | 0.683 | 6 | 0.695 | 7 | 0.660 | 8 |
| (7) People factors | 0.748 | 4 | 0.719 | 6 | 0.813 | 4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| (8) Environment factors | 0.644 | 8 | 0.601 | 8 | 0.675 | 7 |

**Source: primary data**

Quality group has been ranked by the owners respondents in the first position with RII equal 0.8834. It has been ranked by the consultants respondents in the first position with RII equal 0.813 and has been ranked by the contractors respondents in the first position with RII equal 0.833. This group is the most important one for consultants because consultants are interested with clients and technical factors. Consultants observed that quality of equipments and raw materials in project and availability of personals with high qualification affect strongly the quality performance of project. Samson and Lema (2002) remarked that number of disputes and rework tasks through project affects the quality performance. Cheung et al (2004) remarked that quality group affects moderately on the performance of construction projects. Iyer and Jha (2005) observed that quality performance affects the cost performance of construction projects.

Time group has been ranked by the owners respondents in the second position with RII equal 0.817. It has been ranked by the consultants respondents in the second position with RII equal 0.808 and has been ranked by the contractors respondents in the third position with RII equal 0.824. This group is also more important for consultant than for others because the consultant is concerned with planned time for project completion. Samson and Lema (2002) remarked that time performance is affected by schedule stability of construction projects. Cheung et al (2004) remarked that time group affects strongly the performance of construction projects and it can be one of the most important indicators to measure performance.

Client satisfaction group has been ranked by the owners respondents in the third position with RII equal 0.787. It has been ranked by the consultants respondents in the third position with RII equal 0.804 and has been ranked by the contractors respondents in the third position with RII equal 0.826. It is interesting to observe that client satisfaction group is more important for consultants than for contractors because consultants are usually interested with client factors. This is mainly due to financing issues and owner interference which are considered very important by consultants. Samson and Lema (2002); Iyer and Jha (2005) obtained that client satisfaction is affected by information coordination between owner and project parties. Cheung et al (2004) remarked that client satisfaction group affects moderately the performance of construction projects.

People group has been ranked by the owners respondents in the fouth position with RII equal 0.748. It has been ranked by the consultants respondents in the sixth position with RII equal 0.719 and has been ranked by the contractors respondents in the fourth position with RII equal 0.813. It is not surprising to observe that people group is the most important one for contractors because contractors remarked competence development between employees and belonging to work affect strongly on productivity, cost and time performance of contractors. Iyer and Jha (2005) obtained that people group affects the projects performance by participants' attitudes, Commitment to the project, employees motivation and competence development.

Productivity group has been ranked by the owners respondents in the fifth position with RII equal 0.751. It has been ranked by the consultants respondents in the fourth position with RII equal 0.731 and has been ranked by the contractors respondents in the fifth position with RII equal 0.751. It is obtained that this factor has a similar importance for three parties as productivity affects the cost, time and quality performance of projects. Samson and Lema (2002) remarked that productivity is an important indicator affecting the performance of construction projects.

Regular and community satisfaction group has been ranked by the owners respondents in the sixth position with RII equal 0.683. It has been ranked by the consultants respondents in the seventh position with RII equal 0.695 and has been ranked by the contractors respondents in the eighth position with RII equal 0.660. This group is not important for three parties because it rarely affect the project performance because of political situation in the Coastal Region of Kenya. Samson and Lema (2002) obtained that regular and community satisfaction group is one of set of projects performance indicators.

Environment group has been ranked by the owners respondents in the eighth position with RII equal 0.644. It has been ranked by the consultants respondents in the eighth position with RII equal 0.601 and has been ranked by the contractors respondents in the seventh position with RII equal 0.675. It is obtained that this group is not important for three parties because environmental factors such as air quality and noise level do not affect practically on the performance of projects in the Coastal Region of Kenya. Cheung et al (2004) remarked that environment group affects strongly the performance of construction projects. Iyer and Jha (2005) and Ugwu and Haupt (2007) observed that environment group affects moderately the performance of construction projects. This might be because of different location and environmental condition. The following is a brief discussion of the ranking of factors for each group:

**Group one: Cost factors:**

The relative importance index (RII) and rank of cost factors are summarized in Table 4.11.

| **Factors** | **Owner** | | **Consultant** | | **Contractor** | |
|---|---|---|---|---|---|---|
| | **RII** | **Rank** | **RII** | **Rank** | **RII** | **Rank** |
| **(1) Cost factors** | | | | | | |
| Profit rate of project | 0.709 | 4 | 0.791 | 4 | 0.754 | 4 |
| Material and equipment cost | 0.827 | 2 | 0.791 | 3 | 0.828 | 3 |
| Escalation of material prices | 0.862 | 1 | 0.847 | 1 | 0.904 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Differentiation of coins prices | 0.803 | 3 | 0.823 | 2 | 0.889 | 2 |

**Source: primary data**

**Owners view:**

As expected, escalation of material prices has been ranked by the owners respondents in the first position with RII equal 0.862. It is worth noticing that this factor is the most important one for owners because continuous closures in the Coastal Region of Kenya lead to rapid shortage of construction materials and escalation of construction material prices. This escalation of material prices affect the liquidity of owners' projects and cost performance of their projects.

Material and equipment cost has been ranked by the owners respondents in the second position with RII equal 0.827. This factor affects the owner's liquidity and project cost performance. This result is in line with Okuwoga (1998) as material and equipment cost in Nigeria construction projects is practically significant for owners because of poor cost control. However, the result of Iyer and Jha (2005) and Ugwu and Haupt (2007) are not in agreement with our result as this factor is not important to owners because cost of materials and equipments rarely affect the cost performance of construction projects. This might be due to different location, economical and
political situation.

Differentiation of coins prices has also been ranked by the owners respondents in the third position with RII equal 0.803. This mainly because cash flow affects the project budget and project cost performance. This result is in agreement with Samson and Lema (2002) because cash flow can give an important evaluation for the cost performance at any stage of project.

Profit of the project has been ranked by the owners respondents in the fourth position with RII equal 0.709. This factor affects the owners' liquidity, project budget and cost performance. Components of project cost. The result of Ugwu and Haupt (2007) is not in line with our result because cost of labors in South Africa rarely affect the project budget and cost performance. This can be attributed to different location, regulations and laws.

**Consultants view:**

Escalation of material prices has been ranked by the consultants respondents in the first position RII equal 0.862. Continuous closures in the Coastal Region of Kenya due to political tensions lead to rapid shortage of construction materials and escalation of construction material prices. This escalation of material prices affect the cost performance of projects which is related to client's representative.

Differentiation of coins prices has been ranked by the consultants respondents in the third position with RII equal 0.803. This factor is related to clients' representative factors such as owners' liquidity and project budget. Construction projects in the Coastal Region of Kenya suffered from differentiation of coins prices because of difficult political and economical situation (World Bank, 2004).

Profit rate of project has been ranked by the consultants respondents in the fourth position with RII equal 0.709. Cash flow can give an important evaluation for the cost performance at any stage of project. This result is in agreement with Samson and Lema (2002) as cash flow is a significant factor for cost performance evaluation. Profit rate of project has been ranked by the consultants respondents in the fourth position with RII equal 0.791. Profit rate is an important indicator to evaluate cost performance of construction projects. Material and equipment cost has also been ranked by the consultant respondents in the third position with RII equal 0.791. Material and equipment cost is one of the main components of project budget affecting the performance of cost.

**Contractors view:**

Escalation of material prices has been ranked by the contractors respondents in the first position with RII equal 0.904. This factor is the most important one for contractors because continuous closures of roads in the Coastal region of Kenya lead to rapid shortage of construction materials and escalation of construction material prices. This escalation of material prices affect the liquidity of contractors and profit rate of their projects.

Differentiation of coins prices has been ranked by the contractors respondents in the second position with RII equal 0.874. Differentiation of coins prices affects the project's profit rate for contractors and the contractors' cost performance.

Material and equipment cost has been ranked by the contractors respondents in the third position with RII equal 0.828. This factor is considered as one of project cost components. Therefore, material and equipment cost affects the contractors' profit rate and hence their cost performance. Iyer and Jha (2005) and Ugwu and Haupt (2007) are not in agreement with these result as cost of materials and equipments is not important to contractors and it rarely affect the cost performance. This can be attributed to different economical and political situation.

**Comparison between owners, consultants and contractors:**

Comparison between owners, consultants and contractors for cost factors are summarized in Table 4.12:

| **Factors** | **Owner** | | **Consultant** | | **Contractor** | |
|---|---|---|---|---|---|---|
| | **RII** | **Rank** | **RII** | **Rank** | **RII** | **Rank** |
| **(1) Cost factors** | | | | | | |
| Profit rate of project | 0.709 | 4 | 0.791 | 4 | 0.754 | 4 |
| Material and equipment cost | 0.827 | 2 | 0.791 | 3 | 0.828 | 3 |
| Escalation of material prices | 0.862 | 1 | 0.847 | 1 | 0.904 | 1 |
| Differentiation of coins prices | 0.803 | 3 | 0.823 | 2 | 0.889 | 2 |

**Source: primary data**

Escalation of material prices has been ranked by the owners and contractors respondents in the first position. This factor has been also been ranked by the consultants respondents in the first position. It is observed that this factor is more important for owners and contractors because escalation of material prices affects the liquidity of owners and the profit rate of contractors. Continuous closures of shops in the Coastal Region of Kenya lead to rapid shortage of construction materials and escalation of construction material prices. This has been necessitated by the political tensions that have been experienced in the region.

Differentiation of coins prices has been ranked by the owners respondents in the third position. It has been ranked by the consultants respondents in the second position and has been ranked by the contractors respondents in the second position. It is not surprising to find out differentiation of coins prices is more important for contractors than for others because this factor affects the contractors' profit rate and cost performance.

Material and equipment cost has been ranked by the owners respondents in the second position but it has been ranked by the consultants and the contractors respondents in the third position. It is remarked that this factor is more important for owners than for others. Material and equipment cost is one of project cost components which affect the owners' liquidity and project budget. Iyer and Jha (2005) and Ugwu and Haupt (2007) are not in line with the result finding as materials and equipments cost rarely affect the cost performance of Indians' and South Africans' construction projects. This can be attributed to different economical and political situation.

Profit rate of project has been ranked by the owners respondents in the fourth position. It has been ranked by the consultants respondents in the fourth position and has been ranked by the contractors respondents in the fourth position. Cash flow is more important for owners and contractors than for consultants because it can give an important evaluation for the owners' and the contractors' cost performance at any stage of project. Samson and Lema (2002) remarked that cash flow is a significant factor for evaluation and measurement of construction projects' cost performance.

**Group two: Time factors:**

The relative importance index (RII) and rank of time factors are summarized in Table 4.13:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Time factors** | | | | | | |
| Planned time for project | 0.768 | 3 | 0.775 | 3 | 0.780 | 3 |
| Time needed to implement variation orders and Time needed to rectify defects | 0.659 | 4 | 0.672 | 4 | 0.639 | 4 |
| Average delay in claim approval and payment approval owner to contractor | 0.956 | 1 | 0.911 | 1 | 0.958 | 1 |
| Availability of resources as planned through project duration | 0.886 | 2 | 0.873 | 2 | 0.919 | 2 |

**Source: primary data**

**Owners view:**

Average delay in claim approval and payment approval owner to contractor resulting to materials shortage due to cash flow has been ranked by the owner respondents in the first position with RII equal 0.956. This factor is the most important one for owners because construction projects in the Coastal Region of Kenya is suffering from time performance problems such as delay due to closures and materials shortage. Owners usually feel with this sensitive problem in their projects. Delay in payment from owner to contractor lead to delay of contractors' performance and cause problem in time performance. This may also lead to disputes and claims between owner and contractor of project. All of that will affect the overall performance of project which has been implemented. Karim and Marosszeky (1999) are in line with our result because that average delay in payment from owner to contractor affects the time performance and causes delay of project.

Availability of resources as planned through project duration has been ranked by the owner respondents in the second position with RII equal 0.886. This factor affects directly and practically on project performance such as time. If resources are not available as planned through project duration, the project will suffer from problem of time and cost performance. This result is in line with Samson and Lema (2002) as it is remarked that resource availability affects on processes performance of construction projects. In addition, Iyer and Jha (2005) and Ugwu and Haupt (2007) are in agreement with our result because availability of resources as planned through project duration is an important factor for owners in Indian and South African

Planned time for project construction has been ranked by the owner respondents in the third position with RII equal 0.768. Planned time for project construction may not be suitable practically. If planned time is not suitable for implementation, the performance of project will suffers from delay and disputes between the owner and other parties of project. Owners usually want their projects to finish as early as possible. Cheung et al (2004) and Iyer and Jha (2005) are in agreement with the result as planned time for project construction is an important for owners because this factor affects strongly the time performance.

Time needed to implement variation orders has been ranked by the owner respondents in the fourth position with RII equal 0.768. Time needed to implement variation orders, will affect the performance of basic schedule. Therefore, this will affect the time performance. This result is in line with Samson and Lema (2002) and Cheung et al (2004) as this factor affects strongly the

time performance. For example, estimated schedule will be changed and modified.

**Consultants view:**

Average delay in claim approval and payment approval from owner to contractor has been ranked by the consultants respondents in the first position with RII equal 0.776. Delay in payment from owner to contractor lead to delay of project performance. This may also lead to disputes and claims between consultant and contractor of project. All of that will affect the overall performance of project which has been implemented. Karim and Marosszeky (1999) are in line with our result as the average delay in payment from owner to contractor affects the time performance because it causes delay of project. Percentage of orders delivered late has been ranked by the consultants respondents in the first position with RII equal 0.911. When orders from consultant to contractor are delivered late, time performance of project will also be delayed. Then the schedule of project will be affected. This result is in agreement with Karim and Marosszeky (1999) because this factor affects strongly on time performance. Consultants usually feel with this sensitive problem in their projects.

Availability of resources as planned through project duration has been ranked by the consultants respondents in the second position with RII equal 0.873. This factor affects directly and practically on project performance such as time. If resources are not available as planned through project duration, the project will suffer from problem of time performance. This result is in agreement with Samson and Lema (2002) and Ugwu and Haupt (2007) as resource availability is an important factor for consultants because it affects the processes performance of construction projects.

Planned time for project construction has been ranked by the consultants respondents in the third position with RII equal 0.768. Planned time for project construction may not be suitable practically. Therefore, the performance of project will suffer from delay and disputes between consultant and contractor. Cheung et al (2004) is in line with the result as this factor affects strongly on time performance.

**Contractors view:**

Average delay in payment from owner to contractor has been ranked by the contractors respondents in the first position with RII equal 0.958. Delay in payment from owner to contractor lead to delay of contractors' performance and cause problem in time performance. This may also lead to disputes and claims between contractor and consultant of project. All of that will affect the overall performance of project that has been implemented. Karim and Marosszeky (1999) are in line with our result as the average delay in payment from owner to contractor affects the time performance because it causes project delay.

Availability of resources as planned through project duration has been ranked by the contractors respondents in the second position with RII equal 0.919. This factor affects directly and practically on contractors' performance through projects. If resources are not available for contractors as planned through project duration, the project will suffer from problem of time and cost performance. This result is in line with Samson and Lema (2002) because resource availability affects on processes performance of contractors. However, Iyer and Jha (2005) and Ugwu and Haupt (2007) are not in agreement with the result findings as availability of resources as planned through project duration is not important for contractors and it is rarely affects the contractors' time performance. This might be due to different location, political and economical situation.

Planned time for project construction has been ranked by the contractors respondents in the third position with RII equal 0.780. Planned time for project construction may not be suitable practically. Therefore, the performance of project will suffer from delay and disputes between contractor and consultant. Cheung et al (2004) and Iyer and Jha (2005) are in line with our result as planned time for project construction is an important for contractors because this factor affects strongly on contractors performance for project time.

**Comparison between owners, consultants and contractors:**

Comparison between owners, consultants and contractors for time factors are summarized in Table 4.14:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Time factors** | | | | | | |
| Planned time for project | 0.768 | 3 | 0.775 | 3 | 0.780 | 3 |
| Time needed to implement variation orders and Time needed to rectify defects | 0.659 | 4 | 0.672 | 4 | 0.639 | 4 |
| Average delay in claim approval and payment approval owner to contractor | 0.956 | 1 | 0.911 | 1 | 0.958 | 1 |
| Availability of resources as planned through project duration | 0.886 | 2 | 0.873 | 2 | 0.919 | 2 |

**Source: primary data**

According to owners, consultants and contractors; average delay in claim approval and payment approval owner to contractor According to owners, consultants and contractors; the delay normally causes closures and materials shortage was the most important performance factor as it has the first rank among all factors with RII = 0.956 for owners, 0.911 for consultants and 0.958 for contractors. This agreement between all target groups is traced to the recent difficult economic situation and government procedures in the country. Construction projects in the Coastal Region of Kenya is not an exception from this kind of situation suffering from complex problems because of closures and materials shortage. These problems can be considered as an obstacle for time performance of projects. All owners,

consultants and contractors feel with this sensitive problem in their projects. This agreement between parties is traced to disputes which will happen between project's parties when the payment from owner is delayed. This will affect the performance of project specially time criteria. Karim and Marosszeky (1999) are in agreement with the result findings as the average delay in payment from owner to contractor affects the time performance.

Availability of resources as planned through project duration has been ranked by the owners respondents in the second position. It has been ranked by the consultants respondents in the second position and has been ranked by the contractors respondents in the second position. This factor can be considered as an important for three parties and has a similar rank for all of them. This factor is related to closures and it affects directly on project performance such as time. If resources are not available as planned through project duration, the project will suffer from problem of time performance. This result is in line with Iyer and Jha (2005) because availability of resources as planned through project duration has a similar RII for owners, client representatives and contractors.

Time needed to implement variation order**s** and Time needed to rectify defects has been ranked by the owners respondents in the fourth position and has been ranked by the consultants and contractors respondents in the fourth position. This factor has the same rank for contractors and consultants and it is more important for them because it is related to contractual relationships between them. The contractor cannot implement any stage through project without having orders from project's consultant. Karim and Marosszeky (1999) is in line with these results because this factor affects strongly on time performance Planned time for project construction has been ranked by the owners respondents in the fourth position and has been ranked by the consultants and contractors respondents in the fifth position. This factor is more important for owners as they usually want their projects to finish as early as possible. Cheung et al (2004) and Iyer and Jha (2005) are in agreement with the result findings because this factor affects strongly on time performance and it is considered as an important for owners.

**Group three: Quality factors:**

**Table 4.15 the relative importance index (RII) and rank of quality factors are summarized in the table below.**

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Quality factors** | | | | | | |
| Conformance to specification | 0.897 | 1 | 0.823 | 3 | 0.837 | 3 |
| Availability of personals with high experience and qualification | 0.874 | 2 | 0.863 | 1 | 0.880 | 1 |
| Quality of equipments and raw materials in project | 0.850 | 3 | 0.855 | 2 | 0.876 | 2 |
| Participation of managerial levels with decision making | 0.827 | 4 | 0.799 | 4 | 0.815 | 4 |
| Quality assessment system in Organization and Quality training/meeting | 0.721 | 5 | 0.727 | 5 | 0.758 | 5 |

**Source: primary data**

**Owners view**

Conformance to specification has been ranked by the owner's respondents in the first position with RII equal 0.897 though it is ranked third position by consultants 0.823 and 0.837 with contractors respectively. This factor is the most important one for owners because this factor is an important to owner's satisfaction in term of performance and meeting of the desired end product that meets the owners specifications and standards. The owner usually seeks to implement project according to specification. Iyer and Jha (2005) are in agreement with the result as this factor is significant for owners because this factor is strongly related to client satisfaction.

Availability of personals with high experience and qualification has been ranked by the owners respondents in the second position with RII equal 0.874 and in the first position by both the consultants and contractors with RII equal 0.863 and 0.880 respectively. Availability of personals with high experience and qualification in project lead to implementation of project with suitable cost, time and with professional quality which satisfy the owner. This result is related to Cheung et al (2004) and Iyer and Jha (2005) results as this factor affects strongly on project performance because it affects strongly the degree of owners satisfaction.

Quality of equipments and raw materials in project has been ranked by the owners respondents in the third position with RII equal 0.850 while it has been ranked second by both the consultants and contractors with RII equal 0.855 and 0.876 respectively. The owners usually want materials used in their project with a good quality and according to specification. In the Coastal Region of Kenya, most of available materials are with little variation in quality and produced by a limited number of producers. Based on Cheung et al (2004) and Iyer and Jha (2005), this factor affects the project performance and the degree of owners satisfaction.

Participation of managerial levels with decision-making has been ranked by the owners, consultants and contractors

respondents in the fourth position with RII equal 0.827, 0.799 and 0.815 respectively. If managerial levels share with decision making, this will lead to better implementation of project and this will satisfy the owner with more degree. Iyer and Jha (2005) are in agreement with the result as this factor is practically significant for owners because decision-making depends mainly on work group and participation of working levels.

Quality assessment system in organization has been ranked by the owners consultants and contractors respondents in the fifth position with RII equal 0.827, 0.799 and 0.815 respectively. Quality assessment system in organization is rarely achieved or implemented through construction projects in the Coastal Region of Kenya. This result is in line with Iyer and Jha (2005) and Ugwu and Haupt (2007) as this factor is not significant to owners because of absence of practical quality assessment system in Indian and South African construction projects. However, Samson and Lema (2002) are not in line with the result as this factor affects on contractors performance.

**Consultants view**

Availability of personals with high experience and qualification has been ranked by the consultants respondents in the first position with RII equal 0.863. This factor is the most important one for consultants because availability of personals with high experience and qualification assist consultants to supervise the project with a good professionalism and also this assist them to satisfy the owner with a successful performance of project. This result is in agreement with Cheung et al (2004) and Iyer and Jha (2005) as this factor affects strongly on project performance because it affects strongly the degree of owners satisfaction which is one of the main responsibilities of consultants.

Quality of equipments and raw materials in project has been ranked by the consultants respondents in the second position with RII equal 0.855. Consultants usually want materials used in supervised project with a good quality and according to specification. Based on Cheung et al (2004) and Iyer and Jha (2005), this factor affects the project performance and the degree of owners satisfaction which is one of the main responsibilities of consultants.

Conformance to specification has been ranked by the consultants respondents in the third position with RII equal 0.823. This factor is an important to client representative satisfaction because it is mainly related to owner satisfaction. Iyer and Jha (2005) are in agreement with the result as this factor is significant for client representative because this factor is strongly related to client satisfaction.

Participation of managerial levels with decision-making has been ranked by the consultants respondents in the fourth position with RII equal 0.799. If managerial levels share with decision making, this will lead to better performance of project and this will satisfy the client representative with more degree. Iyer and Jha (2005) are in agreement with our result as this factor is practically significant for client representative because decision-making depends mainly on participation of working levels.

Quality assessment system in organization and quality training/meeting has been ranked by the consultants respondents in the fifth position with RII equal 0.727. Quality training/meeting is rarely achieved or implemented in construction projects in the Coastal Region of Kenya. However, this result is not in agreement with Samson and Lema (2002) as this factor affects strongly on quality performance of construction projects.

**Contractors view**

Availability of personals with high experience and qualification has been ranked by the contractors respondents in the first position with RII equal 0.880. This factor is the most important one for contractors because availability of personals with high experience and qualification assist contractors to implement their projects with a successful and suitable performance. In the Coastal Region of Kenya, the majority of site managers are civil engineers with good work experience but little training or education in management. Samson and Lema (2002), Cheung et al (2004) and Iyer and Jha (2005) are in line with the result as this factor is very important to contractors because it affects strongly on quality performance of construction projects.

Quality of equipments and raw materials in project has been ranked by the contractors respondents in the second position with RII equal 0.876. Contractors must implement their projects according to required and agreed quality because owners and consultants usually want materials used in supervised project according to specification and agreement. Based on Cheung et al (2004) and Iyer and Jha (2005), this factor affects the quality performance and the degree of owners and consultants satisfaction.

Conformance to specification has been ranked by the contractors respondents in the third position with RII equal 0.837. This factor is significant for contractors as it is related to consultants and owners satisfaction. Iyer and Jha (2005) are in agreement with the result as this factor is significant for contractors because this factor is related to consultants and clients satisfaction.

Participation of managerial levels with decision-making has been ranked by the contractors respondents in the fourth position with RII equal 0.815. If managerial levels share with decision making, this will lead to better performance of project and this will satisfy both of consultant and owner with more degree. Iyer and Jha (2005) are in agreement with the result as this factor is practically significant for contractors because decision-making depends mainly on participation of working levels.

Quality assessment system in organization and quality training/meeting been ranked by the contractors respondents in the fifth position with RII equal 0.758. Quality assessment system in organization is rarely achieved or implemented for contractors in the Coastal region of Kenya. Ugwu and Haupt (2007) are in agreement with our result as this factor is not important to contractors because of absence of quality assessment systems in South African construction projects. However, Samson and Lema (2002) and Iyer and Jha (2005) are not in line with the result findings as this factor is significant for contractors performance in Tanzania and India construction projects. This might be due to different location and different managerial properties.

**Group four: Productivity factors:**

The relative importance index (RII) and rank of productivity factors are summarized in Table 4.16:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Productivity factors** | | | | | | |
| Project complexity | 0.744 | 4 | 0.727 | 2 | 0.776 | 2 |
| Management-labor relationship | 0.791 | 3 | 0.703 | 3 | 0.758 | 3 |
| Absenteeism rate through project | 0.791 | 2 | 0.703 | 4 | 0.758 | 4 |
| Sequencing of work according to Schedule | 0.815 | 1 | 0.821 | 1 | 0.819 | 1 |

**Source: primary data**

**Owners view:**

Sequencing of work according to schedule has been ranked by the owner's respondents in the first position with RII equal 0.815. This factor is the most important one for owners because sequencing of work according to schedule assists the owner to deliver project according to scheduled time for project completion. Samson and Lema (2002) are in agreement with the result as sequencing of work affects the productivity performance of construction projects.

Absenteeism rate through project has been ranked by the owners respondents in the second position with RII equal 0.791. Absenteeism through project will affect the productivity performance of project. Therefore, the owner will suffer from delay of project. This result is in agreement with Samson and Lema (2002) and Iyer and Jha (2005) as it is remarked that absenteeism through project implementation is very important for owners because it affects on productivity performance of construction projects.

Management-labor relationship has also been ranked by the owners respondents in the third position with RII equal 0.791. Management-labor relationship can assist for strong coordination and motivation between labor level and managerial level. This will assist for implementation of project with success productivity and good performance. All of that will satisfy the owner of project. This result is in line with Samson and Lema (2002) as management-labor relationship is significant for productivity performance of construction projects. However, Iyer and Jha (2005) are not in agreement with the result as this factor is moderately important for owners in Indian construction projects. This might be due to different location and culture.

Project complexity has been ranked by the owners respondents in the fourth position with RII equal 0.776. Project complexity affect the degree of overall performance through project. Iyer and Jha (2005) are not in line with our result as this factor is moderately important for owners. In addition, Ugwu and Haupt (2007) are not in agreement with our result as this factor is not important for owners. This might be due to different locations and projects types.

**Consultants view:**

Sequencing of work according to schedule has been ranked by the consultants respondents in the first position with RII equal 0.821. This factor is the most important one for consultant because sequencing of work according to schedule assists consultant to deliver project to the owner according to scheduled time for project completion. Samson and Lema (2002) are in agreement with our result as sequencing of work affects the productivity performance of construction projects. Project complexity has been ranked by the consultants respondents in the second position with RII equal 0.727. Degree of project complexity is correlated with experiences required for supervision and skills needed to monitor and supervise performance of project. Iyer and Jha (2005) are not in line with our result as this factor is moderately important for client representatives in Indian construction projects. In addition, Ugwu and Haupt (2007) are not in agreement with the result as this factor is not important for consultants. This might be because of different locations and projects types. Absenteeism rate through project has been ranked by the consultants respondents in the third position with RII equal 0.703. Absenteeism through project will affect the productivity and time performance of project. Samson and Lema (2002) are in agreement with our result as absenteeism affects the productivity performance of construction projects.

Management-labor relationship has also been ranked by the consultants respondents in the third position with RII equal 0.703. Management-labor relationship can assist for strong coordination and motivation between contractor level and consultant level. This will lead to implement project with success supervision and so good performance of consultant. This result is in agreement with Samson and Lema (2002) as management-labor relationship is significant for productivity performance of construction projects.

**Contractors view:**

Sequencing of work according to schedule has been ranked by the contractors respondents in the first position with RII equal 0.819. This factor is the most important one for contractors because sequencing of work according to schedule assists contractors to implement project according to scheduled time for project completion. Therefore, the contractors will not suffer from time and cost performance problems. Samson and Lema (2002) are in line with our result as sequencing of work affects the productivity performance of contractors.

Management-labor relationship has been ranked by the contractors respondents in the third position with RII equal 0.758. Management-labor relationship can assist for strong coordination and motivation between labor level and managerial level. This will lead to implement project with success productivity and suitable time performance of project. Samson and Lema (2002) are in agreement with our result as management-labor relationship is significant for productivity performance of construction projects. However, Iyer and Jha (2005) are not in agreement with our result as this factor is

moderately important for contractors. This might be due to different location, culture and management coordination.

Project complexity has been ranked by the contractors respondents in the second position with RII equal 0.776. Degree of project complexity is related with experiences required for implementation and skills needed to construct project. All of that affect on the degree of contractors performance. Ugwu and Haupt (2007) are in line with our result as this factor is an important for contractors because performance of construction projects mainly depends up on project complexity. However, Iyer and Jha (2005) are not in agreement with the result as this factor is moderately important for contractors in India. This might be because of different location and construction projects nature.

Absenteeism rate through project has been ranked by the contractors respondents in the fourth position with RII equal 0.758. Absenteeism through project will affect the productivity. The contractor will suffer from time performance problem. This result is in agreement with Samson and Lema (2002) and Iyer and Jha (2005) as absenteeism through project implementation is very important for contractors because it affects the productivity performance of contractors.

**Comparison between owners, consultants and contractors:**
Comparison between owners, consultants and contractors for productivity factors are summarized in Table 4.17:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Productivity factors** | | | | | | |
| Project complexity | 0.744 | 4 | 0.727 | 2 | 0.776 | 2 |
| Management-labor relationship | 0.791 | 3 | 0.703 | 3 | 0.758 | 3 |
| Absenteeism rate through project | 0.791 | 2 | 0.703 | 4 | 0.758 | 4 |
| Sequencing of work according to Schedule | 0.815 | 1 | 0.821 | 1 | 0.819 | 1 |

**Source: primary data**

Sequencing of work according to schedule has been ranked by owners, consultants and contractors in the first position. This factor is the most important one for three parties because sequencing of work according to schedule assists them to perform project according to scheduled time for project completion. Therefore, there is no delay or cost overruns. Samson and Lema (2002) are in line with our result as sequencing of work affects the productivity performance of contractors.

Management-labor relationship has been ranked by owners and contractors respondents in the second position and has been ranked by consultants respondents in the third position. However, this factor is considered as an important for three parties as management-labor relationship can assist them for strong coordination and motivation between labor level and managerial level. This will lead to implement project with success productivity and so good performance of project. This result is in line with Samson and Lema (2002) as management-labor relationship is significant for productivity performance of construction projects. However, Iyer and Jha (2005) are not in agreement with our result as this factor is moderately important for owners and contractors. This might be due to different location and culture.

**Group five: Client Satisfaction factors:**

The relative importance index (RII) and rank of client satisfaction factors are summarized in Table 4.18:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Client Satisfaction factors** | | | | | | |
| Information coordination between owner and project parties | 0.744 | 3 | 0.807 | 2 | 0.824 | 2 |
| Leadership skills for project Manager /Owner | 0.850 | 1 | 0.863 | 1 | 0.919 | 1 |
| Number of disputes between owner and project parties | 0.768 | 2 | 0.743 | 3 | 0.735 | 3 |

**Source: Primary data**

**Owners view:**

Leadership skills for project manager have been ranked by the owners respondents in the first position with RII equal 0.850. This factor is the most important one for owners because leadership skills for project manager affect the degree of project performance and client satisfaction. This result is in line with Cheung et al (2004) as this factor is an important for effectiveness on project performance. Otherwise, Iyer and Jha (2005) are not in agreement with our result as this factor is moderately important for owners. This might be due to different location and management style.

Number of disputes between owner and project parties have been ranked by the owners respondents in the second position with RII equal 0.753. Disputes between owner and project parties will affect on relationship between them and also the degree of client satisfaction will be decreased. All of that can affect the performance of project. Samson and Lema (2002) and Iyer and Jha (2005) are in agreement with our result as this factor is high

important for owners because number of disputes affects strongly on client satisfaction and project performance.

Information coordination between owner and project parties has been ranked by the owners respondents in the third position with RII equal 0.744. Information coordination between owner and project parties will lead to strong relationship between them and the client will be more satisfied. Samson and Lema (2002) and Cheung et al (2004) are in line with the result as this factor is an important for effectiveness on construction project performance because information coordination affects on client satisfaction. On the other hand, Iyer and Jha (2005) are not in agreement with our result as this factor is moderately important for owners. This might be because of different location and culture. Speed and reliability of service to owner has been ranked by the owners respondents in the fourth position with RII equal 0.718. This factor increases the degree of satisfaction with respect to client. This result is in line with Cheung et al (2004) and Iyer and Jha (2005) as this factor this factor is very important for owners because it affects strongly on client satisfaction.

**Consultants view:**

Leadership skills for project manager have been ranked by the consultants respondents in the first position with RII equal 0.848. This factor is the most important one for consultants because leadership skills for project manager assist consultants to supervise the project with strong and suitable performance. This will convenient and satisfy the client of project. Cheung et al (2004) is in line with the result as this factor is an important for effectiveness on project performance because client satisfaction depends up on it. Information coordination between owner and project parties has been ranked by the consultants respondents in the second position with RII equal 0.807. Information coordination between owner and project parties will lead to strong relationship between owner and consultant. Therefore, the client will be more satisfied. Samson and Lema (2002) and Cheung et al (2004) are in agreement with our result as this factor is an important for effectiveness on construction project performance because it affects the client satisfaction.

Number of disputes between owner and project parties have been ranked by the consultants respondents in the third position with RII equal 0.743. Disputes between owner and consultant will affect on relationship between them and the degree of client satisfaction will be affected. Al of that can affects the performance of project. Samson and Lema (2002) are in agreement with our result as this factor is an important for construction project performance because it affects strongly on client satisfaction.

Number of reworks has been ranked by the consultants respondents in the third position with RII equal 0.743. This factor has an effect on client satisfaction and project performance. Samson and Lema (2002) are in line with our result as number of reworks affects the project performance because it affects the client satisfaction.

**Contractors view:**

Leadership skills for project manager have been ranked by the contractors respondents in the first position with RII equal 0.919 for contractors. This factor is the most important one for contractors because leadership skills for project manager affect the construction contractors performance. Cheung et al (2004) and Iyer and Jha(2005) are in line with our result as this factor is an important for contractors because it is significant for effectiveness on project performance.

Information coordination between owner and project parties will lead to success construction contractors performance and strong relationship between project parties. Samson and Lema (2002) Cheung et al (2004) are in agreement with our result as this factor is an important for contractors because information coordination affects the client satisfaction and project performance. However, Iyer and Jha (2005) are not in line with our result as this factor is moderately important for contractors. This might be due to different location and management style.

Number of disputes between owner and project parties have been ranked by the contractors respondents in the third position with RII equal 0.735. Disputes between owner and contractor will affect the relationship between them and the degree of client satisfaction will be affected. Al of that affects on performance of contractors. Samson and Lema (2002) and Iyer and Jha (2005) are in agreement with our result as this factor is high important for contractors because number of disputes affects strongly on client satisfaction and construction contractors performance.

**Comparison between owners, consultants and contractors:**

Comparison between owners, consultants and contractors for client satisfaction factors are summarized in Table 4.19:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Client Satisfaction factors** | | | | | | |
| Information coordination between owner and project parties | 0.744 | 3 | 0.807 | 2 | 0.824 | 2 |
| Leadership skills for project Manager /Owner | 0.850 | 1 | 0.863 | 1 | 0.919 | 1 |
| Number of disputes between owner and project parties | 0.768 | 2 | 0.743 | 3 | 0.735 | 3 |

**Source: primary data**

Leadership skills for project manager have been ranked by owners, consultants and contractors respondents in the first position. This factor is the most important one for three parties because leadership skills for project manager affect the degree of project performance and client satisfaction. Cheung et al (2004) observed that this factor is an important for effectiveness on project performance. Cheung et al (2004) are in line with our result as this factor is an important for three parties because it is significant for effectiveness on project performance. Number of

reworks has been ranked by owners, consultants and contractors respondents in the fifth position. This factor has the same rank for three parties because number of reworks affect the relationship between them. This result is in line with Samson and Lema (2002) as number of reworks affects the client satisfaction and overall project performance.

Number of disputes between owner and project parties have been ranked by owners respondents in the second position and have been ranked by consultants and contractors respondents in the third position. This factor is more important for owners because disputes between owner and project parties will affect on relationship between them and the degree of client satisfaction will be affected. All of that affects the performance of project. Samson and Lema (2002) and Iyer and Jha (2005) are in agreement with our result as this factor is high important for owners and contractors because number of disputes affects strongly on client satisfaction and construction performance.

Information coordination between owner and project parties has been ranked by the owners and contractors respondents in the third position and has been ranked by the consultant respondents in the second position. This factor is more important for consultants because in formation coordination affects the client satisfaction. Consultants usually are related to client factors. Samson and Lema (2002) and Cheung et al (2004) are in line with our result as this factor is an important for effectiveness on construction project performance because it affects the client satisfaction.

**Group six: Regular and Community Satisfaction factors:**

The relative importance index (RII) and rank of regular and community satisfaction factors are summarized in Table 4.20:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Regular and community satisfaction factors** | | | | | | |
| Cost of compliance to regulators owner and project parties owner and project parties | 0.615 | 4 | 0.663 | 3 | 0.619 | 4 |
| Number of non compliance to regulation | 0.650 | 3 | 0.639 | 4 | 0.629 | 3 |
| Quality and availability of regulator documentation | 0.662 | 2 | 0.751 | 1 | 0.668 | 2 |
| Neighbors and site conditions Problems | 0.803 | 1 | 0.727 | 2 | 0.725 | 1 |

**Source: primary data**

**Owners view**

Neighbors and site conditions problems have been ranked by the owners respondents in the first position with RII equal 0.803. This factor is the most important one for owners because construction projects in the Coastal Region of Kenya usually suffer from this problem due to effects caused to the environment by construction works. This problem affects the time performance of project and causes disputes and delays. Iyer and Jha (2005) are not in agreement with our result as this factor is not important for owners. This might be because of different location, environment and culture. Quality and availability of regulator documentation has been ranked by the owners respondents in the second position with RII equal 0.662. Quality and availability of regulator documentation affects the regular and community satisfaction. Project performance will also be affected. This result is in line with Samson and Lema (2002) as this factor affects the project performance because it affects the regular and community satisfaction.

Number of non-compliance to regulation has been ranked by the owners respondents in the third position with RII equal 0.650. The more increase of non compliance to regulation, the more dissatisfaction of regular and community for project. This will affect the project performance. This result is in agreement with Samson and Lema (2002) as this factor affects the project performance because it affects the regular and community satisfaction.

Cost of compliance to regulators requirements has been ranked by the owners respondents in the fourth position with RII equal 0.615. Cost of compliance to regulators requirements affects the cost performance of project. Samson and Lema (2002) is in line with our result as this factor affects the regular and community satisfaction.

**Consultants view**

Quality and availability of regulator documentation has been ranked by the consultants respondents in the first position with RII equal 0.751. This factor is the most important one for consultants as quality and availability of regulator documentation affects the regular and community satisfaction. Project performance will also be affected. This result is in line with Samson and Lema (2002) as this factor affects the project performance because it affects the regular and community satisfaction.

Neighbors and site conditions problems has been ranked by the consultants respondents in the second position with RII equal 0.727. Construction projects in the Coastal Region of Kenya usually suffer from this problem. This problem affects the consultant performance of project and causes disputes and delays. Iyer and Jha (2005) are not in line with our result as this factor is not important for client representative. This might be because of different location and culture. Cost of compliance to regulators requirements has been ranked by the consultants respondents in the third position with RII equal 0.663. Cost of

compliance to regulators requirements affects the cost performance of project. Samson and Lema (2002) is in line with our result as this factor affects the regular and community satisfaction.

Number of non-compliance to regulation has been ranked by the consultants respondents in the fourth position with RII equal 0.639. The more increase of noncompliance to regulation, the more dissatisfaction of regular and community for project. This will affect the project performance. This result is in agreement with Samson and Lema (2002) as this factor affects the project performance because it affects the regular and community satisfaction.

**Consultant view**

Neighbors and site conditions problems has been ranked by the contractors respondents in the first position with RII equal 0.725. Contractors considered this factor as the most important one because construction projects in the Coastal Region of Kenya usually suffer from this problem. This problem affects the performance of contractors and causes disputes and delay of project. Iyer and Jha (2005) are not in agreement with our result as this factor is not important for contractors. This might be because of different location, environment and culture affects the project performance because it affects the regular and community satisfaction.

Neighbors and site conditions problems has been ranked by the consultants respondents in the second position with RII equal 0.725. Construction projects in the Coastal Region of Kenya usually suffer from this problem. This problem affects the consultant performance of project and causes disputes and delays. Iyer and Jha (2005) are not in line with our result as this factor is not important for client representative. This might be because of different location and culture.

Cost of compliance to regulators requirements has been ranked by the consultants respondents in the fourth position with RII equal 0.663. Cost of compliance to regulators requirements affects the cost performance of project. Samson and Lema (2002) is in line with our result as this factor affects the regular and community satisfaction.

Number of non-compliance to regulation has been ranked by the consultants respondents in the fourth position with RII equal 0.639. The more increase of noncompliance to regulation, the more dissatisfaction of regular and community for project. This will affect the project performance. This result is in agreement with Samson and Lema (2002) as this factor affects the project performance because it affects the regular and community satisfaction.

**Contractors view**

Neighbors and site conditions problems has been ranked by the contractors respondents in the first position with RII equal 0.725. Contractors considered this factor as the most important one because construction projects in the Coastal Region of Kenya usually suffer from this problem. This problem affects the performance of contractors and causes disputes and delay of project. Iyer and Jha (2005) are not in agreement with our result as this factor is not important for contractors. This might be because of different location, environment and culture.

The relative importance index (RII) and rank of regular and community satisfaction factors are shown below in table 4.21

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **Regular and community satisfaction factors** | | | | | | |
| Cost of compliance to regulators owner and project parties owner and project parties | 0.615 | 4 | 0.663 | 3 | 0.619 | 4 |
| Number of non compliance to regulation | 0.650 | 3 | 0.639 | 4 | 0.629 | 3 |
| Quality and availability of regulator documentation | 0.662 | 2 | 0.751 | 1 | 0.668 | 2 |
| Neighbors and site conditions Problems | 0.803 | 1 | 0.727 | 2 | 0.725 | 1 |

**Source: primary data**

Neighbors and site conditions problems has been ranked by the owners and contractors respondents in the first position and has been ranked by the consultants respondents in the second position. This factor is more important for owners and contractors because it is strongly related to client satisfaction and contractors performance. However, Iyer and Jha (2005) are not in line with our result as this factor is not important for owners and contractors. This might be because of different location, environment and culture.

Quality and availability of regulator documentation has been ranked by the consultants respondents in the first position and has been ranked by the owners and contractors respondents in the second position. Quality and availability of regulator documentation is more important for consultants because if affects the performance of consultants and community satisfaction. This result is in line with Samson and Lema (2002) as this factor affects the contractors' performance because it affects the regular and community satisfaction.

It is obtained that there is a strong agreement between owners and contractors for ranking of all regular and community satisfaction factors because these factors are more related to contractors' performance and client satisfaction. Generally, it can be said that three parties have similar agreement for ranking of these factors.

**Group seven: People factors:**

The relative importance index (RII) and rank of people factors are summarized in Table 4.22.

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **People factors** | | | | | | |
| Employee attitudes in project | 0.697 | 3 | 0.743 | 1 | 0.810 | 2 |
| Recruitment and competence development between employees | 0.768 | 2 | 0.703 | 3 | 0.824 | 1 |
| Employees motivation Belonging to work | 0.780 | 1 | 0.711 | 2 | 0.806 | 3 |

**Source: primary data**

**Owners view**

Employees' motivation Belonging to work has been ranked by the owners respondents in the first position with RII equal 0.780. Employees' motivation leads to belonging to work and productivity will be improved. However, this result is not in agreement with Iyer and Jha (2005) as this factor is moderately important for owners. This might be due to different culture and management style.

Recruitment and competence development between employees has been ranked by the owners respondents in the second position with RII equal 0.768. Recruitment and competence development between employees improve performance of project and the client will be more satisfied. Samson and Lema (2002) are in line with our result as this factor enhance quality and productivity performance of construction projects. Employee attitudes in project have been ranked by the owners respondents in the third position with RII equal 0.697. Employee attitudes affects the project performance and owner satisfaction. This result is in agreement with Iyer and Jha (2005) as this factor is considered as an important for owners because attitudes of employees is related to client satisfaction and project performance.

**Consultants view**

Employee attitudes in project have been ranked by the consultant respondents in the third position with RII equal 0.743. Employee attitudes affects the project performance and owner satisfaction. This result is in agreement with Iyer and Jha (2005) as this factor is considered as an important for owners because attitudes of employees is related to client satisfaction and project performance.

Employees' motivation has been ranked by the consultants respondents in the second position with RII equal 0.711 Employees' motivation leads to more belonging to work and performance of project will be improved. Recruitment and competence development between employees has been ranked by the consultants respondents in the fourth position with RII equal 0.688. Recruitment and competence development between employees improve performance of consultants through projects and the client will be more satisfied. Samson and Lema (2002) are in line with our result as this factor enhances quality and productivity performance of construction projects.

Recruitment and competence development between employees has been ranked by the owners respondents in the third position with RII equal 0.703. Recruitment and competence development between employees improve performance of project and the client will be more satisfied. Samson and Lema (2002) are in line with our result as this factor enhance quality and productivity performance of construction projects.

**Contractors view**

Recruitment and competence development between employees has been ranked by the consultant respondents in the first position with RII equal 0.824. Recruitment and competence development between employees improve performance of project and the client will be more satisfied. Samson and Lema (2002) are in line with our result as this factor enhances quality and productivity performance of construction projects.

Employee attitudes in project have been ranked by the consultant respondents in the second position with RII equal 0.810. Employee attitudes affects the project performance and owner satisfaction. This result is in agreement with Iyer and Jha (2005) as this factor is considered as an important for owners because attitudes of employees is related to client satisfaction and project performance.

Employees' motivation has been ranked by the consultants respondents in the third position with RII equal 0.806 Employees' motivation leads to more belonging to work and performance of project will be improved. Recruitment and competence development between employees has been ranked by the consultants respondents in the fourth position with RII equal 0.688. Recruitment and competence development between employees improve performance of consultants through projects and the client will be more satisfied. Samson and Lema (2002) are in line with our result as this factor enhances quality and productivity performance of construction projects.

**Comparison between owners, consultants and contractors:**

Comparison between owners, consultants and contractors for people factors are summarized in Table 4.23:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **People factors** | | | | | | |
| Employee attitudes in project | 0.697 | 3 | 0.743 | 1 | 0.810 | 2 |
| Recruitment and competence development between employees | 0.768 | 2 | 0.703 | 3 | 0.824 | 1 |
| Employees motivation Belonging to | 0.780 | 1 | 0.711 | 2 | 0.806 | 3 |

work

**Source: primary data**

Employees motivation Belonging to work has been ranked by the owners respondents in the first position while it has been ranked by consultants and contractors in the second and third. This factor is the most important one for three parties because belonging to work usually improves productivity and performance of project. Iyer and Jha (2005) are in agreement with this result as this factor is an important for three parties because belonging to works improve productivity and performance of project.

Recruitment and competence development between employees has been ranked by the owners respondents in the second position. It has been ranked by the consultants respondents in the third position and has been ranked by the contractors respondents in the first position. It is remarked that this factor is important for contractors because contractors require competent employees in the Coastal Region of Kenya. Iyer and Jha (2005) remarked that this factor is moderately important for contractors because of absence of recruitment and competence development between employees system in construction projects. However, other factors are obtained that more important for one party than others as shown previously.

**Group ten: Environment factors:**

The relative importance index (RII) and rank of environment factors are summarized in Table 4.24:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **(8) Environment factors** | | | | | | |
| Air quality | 0.603 | 3 | 0.607 | 2 | 0.686 | 2 |
| Noise level | 0.580 | 4 | 0.527 | 4 | 0.628 | 4 |
| Wastes around the site | 0.650 | 2 | 0.599 | 3 | 0.664 | 3 |
| Climate condition in the site | 0.744 | 1 | 0.671 | 1 | 0.722 | 1 |

**Source: primary data**

**Owners view**

Climate condition in the site has been ranked by the owners respondents in the first position with RII equal 0.744. This factor is the most important one for owners because climate condition in the site affects the productivity and time performance of project. This result is not in line with Iyer and Jha (2005) as climate condition is not important for owners because of different location, weather and environment.

Wastes around the site have been ranked by the owners respondents in the second position with RII equal 0.650. Wastes around the site affect the health and safety of employees. This result is in agreement with Cheung et al (2004) as wastes around the site affect strongly the performance of project. However, Ugwu and Haupt (2007) are not in agreement with our result as this factor is not important to owners. This might be because of different location and environment.

Air quality has been ranked by the owners respondents in the third position with RII equal 0.603 Air quality affects the health, safety and productivity performance. Cheung et al (2004) observed that air quality affects strongly the performance of project. However, Ugwu and Haupt (2007) obtained that this factor is not important to owners. This might be because of different location and environment.

Noise level has been ranked by the owners respondents in the fourth position with RII equal 0.580. Noise level affects the productivity performance of project. Ugwu and Haupt (2007) obtained that this factor is not important for owners. This might be because of different location and environment.

**Consultants view**

Climate condition in the site has been ranked by the consultants respondents in the first position with RII equal 0.671. Consultants considered this factor as the most important one because climate condition in the site affects the productivity and time performance of project. Iyer and Jha (2005) are not in agreement with our result as climate condition is not important for consultants. This might be due to different location, whether and environment.

Air quality has been ranked by the consultants respondents in the second position with RII equal 0.592. Air quality affects the health, safety and productivity performance. Cheung et al (2004) observed that air quality affects strongly the performance of project. However, Ugwu and Haupt (2007) obtained that this factor is not important to consultants. This might be because of different location and environment.

Wastes around the site have been ranked by the consultants respondents in the third position with RII equal 0.599. Wastes around the site affects the health and safety of employees. Cheung et al (2004) remarked that wastes around the site affect strongly the performance of project. However, Ugwu and Haupt (2007) obtained that this factor is not important to consultants. This might be because of different location and environment. Noise level has been ranked by the consultants respondents in the fourth position with RII equal 0.527. Noise level affects the productivity performance of project. Ugwu and Haupt (2007) obtained that this factor is not important for consultants. This might be because of different location and environment.

**Contactors view**

Climate condition in the site has been ranked by the contractors respondents in the first position with RII equal 0.722. Contractors considered this factor as the most important one because climate condition in the site affects the productivity and time performance of project. This result is not in agreement with Iyer and Jha (2005) as climate condition is not important for contractors. This might be because of different location, weather and environment.

Air quality has been ranked by the contractors respondents in the second position with RII equal 0.686. Air quality affects the

health, safety and productivity performance of contractors. Cheung et al (2004) and Ugwu and Haupt (2007) are in line with our result as this factor is very important for contractors because it affects strongly the performance of contractors.

Wastes around the site have been ranked by the contractors respondents in the third position with RII equal 0.664. Wastes around the site affects the health and safety of employees. Cheung et al (2004) observed that wastes around the site affect strongly the performance of project. However, Ugwu and Haupt (2007) obtained that this factor is not important to contractors. This might be because of different location and environment.

Noise level has been ranked by the contractors respondents in the fourth position with RII equal 0.628. Noise level affects the productivity performance of contractors. Ugwu and Haupt (2007) obtained that this factor is moderately important for contractors. This might be because of different location and environment.

**Comparison between owners, consultants and contractors:**

Comparison between owners, consultants and contractors for environment factors are summarized in Table 4.25:

| Factors | Owner | | Consultant | | Contractor | |
|---|---|---|---|---|---|---|
| | RII | Rank | RII | Rank | RII | Rank |
| **(8) Environment factors** | | | | | | |
| Air quality | 0.603 | 3 | 0.607 | 2 | 0.686 | 2 |
| Noise level | 0.580 | 4 | 0.527 | 4 | 0.628 | 4 |
| Wastes around the site | 0.650 | 2 | 0.599 | 3 | 0.664 | 3 |
| Climate condition in the site | 0.744 | 1 | 0.671 | 1 | 0.722 | 1 |

**Source: primary data**

Climate condition in the site has been ranked by the owners, consultants and contractors respondents in the first position. This factor is the most important one for them because it affects the productivity and time performance of project. This result is not in agreement with Iyer and Jha (2005) as climate condition is not important for three parties. This might be because of different location, weather and environment.

Noise level has been ranked by the owners, consultants and contractors respondents in the fourth position. However, for all parties, noise level is less important than other environmental factors because it is rarely obtained in the coastal region of Kenya Ugwu and Haupt (2007) remarked that this factor is not important for owners and consultants but it is moderately important for contractors. Generally, noise level affects the productivity performance of construction projects.

**Degree of Agreement among the Owners, Contractors and Consultants Regarding Factors Affecting the Performance of Construction Projects.**

To determine whether there is a significant degree of agreement among the three groups (Owners, Contractors and Consultants) Kendall's Coefficient of Concordance is used as a measure of agreement among raters. Each case is a judge or rater and each variable is an item or person being judged. For each variable, the sum of ranks is computed. Kendall's W, ranges between zero (no agreement) and one (complete agreement).

To determine whether there is degree of agreement among the levels of each of the factors affecting the performance of construction projects for each owner, contractors and consultants, Kendall's Coefficient of Concordance says that the degree of agreement on a zero to one scale is (Moore et al, 2003; Frimpong et al, 2003):

$$W = \frac{12U - 3m^2 n (n-1)^2}{M^2 n (n-1)} \quad (1)$$

$$U = \sum_{i=1}^{n} R$$

□ n = number of factors;
□ m = number of groups;
□ j = the factors 1,2,.,N.
□ Null Hypothesis: H0 : There is insignificant degree of agreement among the
Owners , Contractors and Consultants.
□ Alternative Hypothesis: H1 : There is significant degree of agreement among the
Owners , Contractors and Consultants.

**Table 4.26 shows the results of Kendall's Coefficient of Concordance for each group:**

| Field | W | Chi-square | P-Value | Decision |
|---|---|---|---|---|
| Cost factors | 0.586 | 152.946 | 0.000 | Reject H0 |
| Time Factors | 0.457 | 119.277 | 0.012 | Reject H0 |
| Quality Factors | 0.586 | 152.946 | 0.000 | Reject H0 |
| Client satisfaction factors | 0.537 | 140.157 | 0.000 | Reject H0 |
| People Factors | 0.484 | 126.324 | 0.004 | Reject H0 |
| Environmental factors | 0.217 | 56.637 | 0.995 | Don't Reject H0 |
| All factors | 0.507 | 132.327 | 0.001 | Reject H0 |

**Source: primary data**

The agreement is significant at level of significant á = 0.05

For Cost, Time, Quality, Productivity, Client Satisfaction, People and environmental factors, and all groups together, the p-values (Sig.) are less than á = 0.05 (á is the level of significance) the null hypothesis, H0, is rejected and the alternative hypothesis, H1, is accepted. Therefore, it can be said that there is a significant degree of agreement among the owners, contractors and consultants regarding factors affecting the performance of construction projects in the Coastal Region of Kenya.

On the other hand, for regular and community satisfaction, Health and Safety, and Environment factors, the p-values (Sig.) are greater than á = 0.05 (á is the level of significance) then we don't reject the null hypothesis, H0. Therefore, it can be said that there is insufficient evidence to support the alternative hypothesis, H1. Hence, there is insignificant degree of agreement among the owners, contractors and consultants regarding factors affecting the performance of construction projects in the Coastal Region of Kenya.

**Means Differences of the Respondents Agreements Regarding the Factors Affecting the Performance of Construction Projects**

The Kruskal-Wallis. (KW) test is a statistical test that is used to compare the ranks means between two or more samples. This test is used in order to check out if there are any significant differences in the point of view of the respondents (Owners, Contractors and Consultants) regarding the levels of each of the factors affecting the performance of construction projects. The KW results are shown in the following.

**Table (4.27) Kruskal- Wallis test for factors affecting the performance of construction Projects**

| Field | KW value | DF | P-Value (Sig) |
|---|---|---|---|
| Cost factors | 2.141 | 2 | 0.343 |
| Time Factors | 0.097 | 2 | 0.953 |
| Quality Factors | 0.004 | 2 | 0.998 |
| Client satisfaction factors | 2.634 | 2 | 0.268 |
| People Factors | 4.456 | 2 | 0.108 |
| Environmental factors | 2.949 | 2 | 0.753 |

DF : Degrees of Freedom

**Source: primary data**

As shown in previous table, all p-value (sig.) for each group is greater than á = 0.05(á is the level of significance), then there are no significant differences between the organization types (Owners, Contractors and Consultants) regarding their respondent degree to all fields.

**Part Three: The Practices Concerning the Performance of Construction Projects:**

The target groups in this study are owners, consultants and contractors. 120 questionnaires were distributed as follows: 25 to owners, 35 to consultants and 60 to contractors. 88 questionnaires were received (73%) as follows: 17 (70%) from owners, 25 (72%) from consultants and 46 (77%) from contractors as respondents. This part of study discusses the practices concerning the performance of construction projects.

**Time management practice**

What kind of method do you use to represent the project planning and scheduling? Table (4.28) Usage of planning method.

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Bar Chart | 56.25 | 41.67 | 53.49 |
| Critical Path Method | 43.75 | 54.77 | 32.56 |
| S-Curve | - | 4.17 | 11.63 |
| Others | - | - | 2.33 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.26 shows that Bar Chart method is the most important planning and scheduling method for owners and contractors because Bar Chart method can facilitate time performance control for each scheduled activity through project implementation. However, Critical Path Method (CPM) is the most important one for consultants because CPM can be used to determine critical activities of project. This will assist consultants to evaluate overall time performance and to identify the effectiveness of critical path on completion date of project. S-Curve method is never used by owners and it is rarely used by consultants and contractors. This is because S Curve method can compare only between actual time and estimated time at any stage through project implementation. It is difficult to control time performance for each scheduled activity and it is difficult to obtain critical path affecting overall time performance of project.

Chen (2007) remarked that in many situations, time of projects can be complicated and challenging to be managed. When the activity times in the project are deterministic and known, critical path method (CPM) has been demonstrated to be useful tool in managing projects in an efficient manner to meet this challenge. Koo et al (2007) stated that construction planners face many scheduling challenges during the course of a project. Planners today rely on CPM-based scheduling tools to evaluate different sequencing alternatives for their feasibility and whether they will meet project deadlines

2. How often your project team does formally meet for discussion of monitoring, updating and controlling the progress?

**Table (4.29) Frequency of meeting type of project team**

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Daily | 11.76 | 4.17 | 10.87 |
| Weekly | 70.59 | 87.50 | 80.43 |
| Monthly | 17.65 | 4.17 | 8.70 |
| No | - | 4.17 | - |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.27 shows that owners, consultants and contractors often meet weekly for discussion. Weekly meeting assist them for monitoring, updating and controlling the progress through project implementation. In addition, they can solve problems, evaluate current performance, and improve future works. Respondents are rarely meets daily or monthly. Daily meeting are required in the case of sensitive and very important works. Monthly meeting is not effective for monitoring or updating processes. Navon (2005) stated that a controlling and updating is an important element to identify factors affecting construction project performance. Marica (2007) obtained that the controlling and monitoring works affect the quality, production and management system.

3. How often do you coordinate your schedule with master schedule of the project owner?

**Table (4.30) Coordination frequency of current schedule with master schedule**

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Increase salary | 58.82 | 59.09 | 52.17 |
| Bonus in position | - | 9.09 | 15.22 |
| Training | 26.67 | 13.64 | 19.57 |
| Others | 20.00 | 18.18 | 13.04 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.28 shows that most of owners, consultants and contractors use increase salary system in order to stimulate the construction time. This system will motivate employees and assist them to improve productivity and performance. This system is more important for employees than bonus in position or training systems because these systems are rarely affect on employees performance or their productivity. This is traced to cultural situation in the the Coastal Region of Kenya. Training is required according to nature of project and its duration. In addition, training is an important for improvement and development overall performance of organization. Chan and Kumaraswamy (2002) proposed specific strategies to increase speed of construction and so to upgrade the construction time performance. It is remarked the better training and motivation system can help to accelerate the performance.

6. Which software do you apply for planning and scheduling the progress the project?

**Table (4.31) Usage of each software for planning and scheduling**

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Primavera | - | 12.00 | 19.57 |
| Microsoft project | 88.24 | 88.00 | 50.00 |
| Excel sheet | 11.76 | - | 26.09 |
| Others | - | - | 4.35 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.29 shows that Microsoft project is the most important, famous and easy program used by owners, consultants and contractors for planning and scheduling. This program enables them to schedule, monitor, update and control many criteria of project such as time, cost and resources. In addition, most organizations in the Coastal Region of Kenya are familiar with this program to be used for planning and scheduling processes. It is observed that Primavera program is an advanced and a complex program compared with Microsoft project. Construction organizations in the Coastal Region of Kenya are not familiar with Primavera to be used or applied. However, Excel program has a limitation in usage for planning and scheduling.

Chan and Kumaraswamy (2002) remarked that construction programs with advanced available software can help to accelerate the performance. Goh (2005) remarked that information technology management leads to performance improvement in the construction industries. For instance, in Singapore 2003, general administration, design, project management, planning, scheduling, site management were enhanced by using of IT. In addition, there were more advantages as quick working, good quality of work and fast access of information.

7. Did your company formally participate in the pre-project planning effort? Table (4.32) Company formally participation in the pre-project planning effort.

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Yes, as the pre-project planner | 75.00 | 12.00 | 23.91 |
| Yes, as the consultant | 12.50 | 80.00 | 8.70 |
| No | 12.50 | 8.00 | 67.39 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.30 shows that most owners participate in the pre-project planning effort as the pre-project planner. Most

consultants participate in the pre-project planning effort as the consultant. However, Most contractors do not participate in the pre-project planning effort. Planning of construction projects is one of the main duties and responsibilities of consultants. Owners mainly need planning for budget and time estimation of projects. Some contractors participate in the planning for complex and large projects. This depend up on the nature and type of implemented works. Wang (2004) remarked that construction planning and efficient site utilization are of importance in the site management of building construction. Today.s complex projects, coupled with an increasing number of project participants, require more effective planning and communication.

8. Did projects be delay because of the Coastal Region of Kenya political conditions?

**Table (4.33) Delay of projects because of the Coastal region of Kenya political conditions**

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Yes | 88.24 | 88.00 | 76.09 |
| No | - | - | 2.17 |
| Sometimes | 11.76 | 12.00 | 21.74 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.31 shows that most owners, consultants and contractors agree that projects were delay because of the Coastal Region of Kenya political conditions. Continuous closures in the Coastal Region of Kenya lead to rapid shortage of construction materials and delay of projects. This problems can be considered as an obstacle for time performance of construction projects. All owners, consultants and contractors feel with such this sensitive problem in their projects

**Cost management practice:**

1. Do you have the cost schedule associated with the estimated time schedule? Table (4.34) Presence of cost schedule associated with the estimated time schedule.

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Yes | 68.75 | 64.00 | 58.70 |
| No | 6.25 | 4.00 | 17.39 |
| Sometimes | 25.00 | 32.00 | 23.91 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.32 shows that construction organizations often use cost schedule associated with the estimated time schedule. This association assist organizations to evaluate performance of cost and time together at any stage through project implementation. That will assist construction organizations to know if project is ahead or behind of schedule and if it is over or under estimated cost. Reichelt and Lyneis (1999) obtained that time schedule and budget performance are controlled by the dynamic feedback process. Those processes include the rework cycle, feedback loops creating changes in productivity and quality, and effects between work phases.

2. Do you apply the actual value and earned value concept in controlling cost for the project?

Table 4.33 shows that most of owners, consultants and contractors apply the actual value and earned value concept in controlling cost for the project. Earned value concept provides a system for evaluating the performance of the project through integrating cost, schedule, and work. This will assist for evaluation cost and time performance of projects. For example, at any stage of project, if earned value is more than actual value, the cost performance will be good. Vandevoorde (2006) stated that Earned value project management is a well-known management system that integrates cost, schedule and technical performance. It allows the calculation of cost and schedule variances and performance indices and forecasts of project cost and schedule duration. The earned value method provides early indications of project performance to highlight the need for eventual corrective action.

3. Do you have a cost engineer who is only responsible for dealing with cost control? Table (4.35) Having a cost engineer who is only responsible for dealing with cost Control.

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Yes | 11.76 | 28.00 | 30.43 |
| No | 76.47 | 60.00 | 43.48 |
| Sometimes | 11.76 | 12.00 | 26.09 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.35 shows that most of owners, consultants and contractors do not have a cost engineer who is only responsible for dealing with cost control. This is because most construction firms in the Coastal Region of Kenya are small size nature. Hence, their needs to cost engineer is much lower than large companies. Chan and Kumaraswamy (1996) stated that poor site management and low speed of decision making involving all project teams affecting cost performance control of project. Reichelt and Lyneis (1999) obtained that project cost performance can be controlled by the dynamic feedback process. Those processes include the rework cycle, feedback loops creating changes in productivity and quality, and effects between work phases.

4. Do you give right and authority for line managers to manage the actual expenses?

**Table (4.36) Giving right and authority for line managers to manage the actual Expenses.**

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Yes | 41.18 | 29.17 | 43.48 |
| No | 23.53 | 41.67 | 32.61 |
| Sometimes | 35.29 | 29.17 | 23.91 |

| | | | |
|---|---|---|---|
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.36 shows that most owners and contractors give right and authority for line managers to manage the actual expenses. However, most of consultants do not give right and authority for line managers to manage the actual expenses. Giving right and authority for line managers to manage the actual expenses depends mainly on the nature and size of works. Chan and Kumaraswamy (2002) remarked that effective communication and fast information transfer between managers and participants help to accelerate the building construction process and performance.

5. Do you apply any software to plan, monitor, and control cost?

**Table (4.37) Applying any software to plan, monitor, and control cost**

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Yes | 47.06 | 50.00 | 45.65 |
| No | 23.53 | 33.33 | 28.26 |
| Sometimes | 29.41 | 16.67 | 26.09 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.37 shows that most owners, consultants and contractors use software program in order to facilitate planning, monitoring and controlling cost. The most programs used in construction organization in order to control and monitor cost are: Excel and Ms Project programs. Most organizations are familiar with these software programs because they are easy to be used and have different facilities and functions to control the cost. Goh (2005) remarked that information technology management leads to performance improvement in the construction industries. For instance, in Singapore 2003, general administration, design, project management, cost control, site management was enhanced by using of IT. In addition, there were more advantages as quick working and good quality of work.

6. Do you apply the following records to estimate the construction cost for the
project?

**Table (4.38) Applying the following records to estimate the construction cost for the Project.**

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Historical cost data | 45.8 | 40.5 | 37.1 |
| Current quotation for labor material and equipment cost | 54.2 | 56.8 | 59.7 |
| Others | - | 2.7 | 3.2 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.38 shows that most owners, consultants and contractors use current quotation for labor, material and equipment cost to estimate the construction cost for the project. This method is more accurate for cost estimation than others because it depend on current situation. However, historical data is interested to be used for owners, consultants and contractors as an experience can assist for quick evaluation and estimation. Dissanayaka and Kumaraswamy (1999) stated that the current knowledge for construction industry that would influence performance enables project managers to pay special attention to control performance more effectively. Thomas (2002) stated that documenting and archiving performance data could be useful for future reference and projects.

7. Did the project be delay by late payment from the owner?

**Table (4.39) Delay of project by late payment from the owner**

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Yes | 35.29 | 32.00 | 28.26 |
| No | 29.41 | 12.00 | 15.22 |
| Sometimes | 35.29 | 56.00 | 56.52 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.39 shows that most consultants and contractors stated that the project was sometimes delay by late payment from the owner. In the Coastal Region of Kenya, contractors usually suffer from this problem. Delay in payment from owner to contractor lead to delay of contractors' performance and cause problem in time performance. This may also lead to disputes and claims between owner and contractor of project. All of that will affect the overall performance of project which has been implemented. Karim and Marosszeky (1999) remarked that average delay in payment from owner to contractor affects the time performance and causes delay of project.

8. Did the actual cost of projects be more than the estimated cost because of the Coastal Region of Kenya political conditions?

Table (4.40) The percent if actual cost of projects was more than the estimated cost because of the Coastal region of Kenya political conditions

| Item | Percentage % (Frequency) | | |
|---|---|---|---|
| | Owner | Consultant | Contractor |
| Yes | 76.47 | 80.00 | 82.61 |
| No | - | 4.00 | 2.17 |
| Sometimes | 23.53 | 16.00 | 15.22 |
| Total | 100 | 100 | 100 |

**Source: primary data**

Table 4.41 shows that most owners, consultants and contractors agree that actual cost of projects was more than the estimated cost because of the Coastal Region of Kenya political conditions. Continuous closures in the Coastal Region of Kenya lead to rapid shortage of construct the Coastal Region of Kenya ion materials and escalation of construction material prices. This escalation of material prices affect the liquidity and cost performance of projects.

## V. CONCLUSION AND RECOMMENDATIONS

**Conclusion**

Construction industry is considered as an important sector in the world as it develops and achieves the goals of society. The performance of the construction industry is affected by clients, contractors, consultants, stakeholders, regulators, national economies and others. The main aim of this thesis is to identify the factors affecting the performance of construction projects in the Coastal Region of Kenya. The aim of this research was broken down into the following objectives:

**To determine the factors affecting the performance of construction projects in the Coastal region of Kenya.**

A structured questionnaire survey approach was considered to study the impact of various attributes and factors affecting construction projects performance. The questionnaire assists to study the attitude of owners, consultants and contractors towards key performance indicators in the construction industry. These questionnaires were distributed to expert engineers such as projects managers, site engineers/office engineers and organizations managers. They have a strong practical experience in construction industries field. Their sufficient experiences are a suitable indication for pilot study.

Forty factors were considered in this study and were listed under eight groups based on literature review. These groups gave a comprehensive summary of the main performance indicators. The indicators were summarized and collected according to previous studies and others are added as recommended by local experts. The main groups considered in this thesis are time, quality, productivity, client satisfaction, regular and community satisfaction, people, and environment.

The target groups in this research were owners, consultants and contractors. 180 questionnaires were distributed as follows: 45 to owners, 55 to consultants and 80 to contractors. 132 questionnaires (73%) were received as follows: 32 (70%) from owners, 40 (72%) from consultants and 61 (77%) from contractors as respondents. The respondents were classified as projects managers, site engineers/office engineers and organizations managers, as they have a practical experience in construction industries field. Their sufficient experiences were a suitable indication to find out the perceptive of the relative importance of project performance indicators of the owner, consultant and contractor parties. Their experiences included many construction fields such as buildings, roads and transportations, and water and sewage projects.

**To identify the most significant project procedures that affect performance of construction projects in the coast.**

According to owners, consultants and contractors the Average delay in claim approval and payment approval owner to contractor resulting to closures and materials shortage was the most important performance factor as it has the first rank among all factors with RII = 0.956 for owners, 0.911 for consultants and 0.958 for contractors. This agreement between all target groups is traced to the payment procedure and economical situations from which the Coastal region of Kenya suffers. Construction projects the Coastal region of Kenya is suffering from these complex problems because of closures and materials shortage. These problems can be considered as an obstacle for performance of projects.

Availability of resources as planned through project duration has been ranked by the owners' respondents in the third position with RII equal 0.886. It has been ranked by the consultants respondents in the second position with RII equal 0.873and has been ranked by the contractors respondents in the third position with RII equal 0.919. This factor can be considered as an important for three parties and it has a similar rank for all parties as it affects directly on project performance such as time. Availability of resources is related to closures. If resources are not available as planned through project duration, the project will suffers from problem of time and cost performance. Hence the schedule is not adhered to.

The most important factors agreed by the owners, consultants and contractors as the main factors affecting the performance of construction projects the Coastal region of Kenya were: escalation of material prices; availability of resources as planned through project duration; average delay because of closures and materials shortage; availability of personals with high experience and qualification; quality of equipments and raw materials in project; and leadership skills for project manager. However, there are some factors which can be considered as more important for one party than for others. This is because contractors are interested with operational and managerial factors. However, the owners and consultants considered the client and technical factors to be more important than operational ones.

Quality group has been ranked by the owners respondents in the first position with RII equal 0.834. It has been ranked by the consultants respondents in the first position with RII equal 0.813 and has been ranked by the contractors respondents in the first position with RII equal 0.833. This group is the most important one for owners, contractor's and consultants because consultants since both are interested with clients and technical factors. Both observed that quality of equipments and raw materials in project and availability of personals with high qualification affect strongly the quality performance of project.

Time group has been ranked by the owners respondents in the second position with RII equal 0.817. It has been ranked by the consultants respondents in the second position with RII equal 0.808 and has been ranked by the contractors respondents in the third position with RII equal 0.824. This group is also more important for consultant and owners than contractors because the consultant is concerned with planned time for project completion.

Client satisfaction group has been ranked by the owners respondents in the third position with RII equal 0.787. It has been ranked by the consultants respondents in the third position with

RII equal 0.804 and has been ranked by the contractors respondents in the third position with RII equal 0.826. It is interesting to observe that client satisfaction group is more important for consultants than for contractors because consultants are usually interested with client factors. This is mainly due to financing issues and owner interference which are considered very important by consultants.

People group has been ranked by the owners respondents in the fouth position with RII equal 0.748. It has been ranked by the consultants respondents in the sixth position with RII equal 0.719 and has been ranked by the contractors respondents in the fourth position with RII equal 0.813. It is not surprising to observe that people group is the most important one for contractors because contractors remarked competence development between employees and belonging to work affect strongly on productivity, cost and time performance of contractors.

**To evaluate Project management actions that affect project performance in the coastal region.**

Kendall's Coefficient of Concordance is used to determine whether there is degree of agreement among performance factors for owners, consultants and contractors. For Cost, Time, Quality, Productivity, Client Satisfaction, People, Innovation and learning factors, and all groups together, there is a significant degree of agreement among the owners, consultants and contractors. This is because all of owners, consultants and contractors are interested with these groups. On the other hand, for Regular and community satisfaction, and Environment factors, there is insignificant degree of agreement among the owners, consultants and contractors. This is because contractors are interested with these factors more or less than owners and consultants. This is because contractors are interested with operational and managerial factors. The owners and consultants considered the client and technical factors to be more important than operational ones.

The Kruskal-Wallis. (KW) test is used in order to check out if there are any significant differences in the point of view of the respondents (owners, consultants and contractors) regarding the levels of each of the factors affecting the performance of construction projects. It was found that there are no significant differences between the organization types (owners, consultants and contractors) regarding their respondent degree to all fields.

**To determine the influence to which the project related factors affects the performance of construction projects in the coastal region.**

The practices concerning with the project performance such as time, cost, project and owner satisfaction were analyzed in order to know the main practical problems in projects performance in the Coastal region of Kenya and then to formulate recommendations to improve performance of construction projects in. The following is a summary and conclusion for the main practices concerning with the project performance indicators in the Coastal region of Kenya.

**Time management practice:**

Bar Chart method is the most important planning and scheduling method for owners and contractors because Bar Chart method can facilitate time performance control for each scheduled activity through project implementation. However, Critical Path Method (CPM) is the most important one for consultants because CPM can be used to determine critical activities of project. This will assist consultants to evaluate overall time performance and to identify the effectiveness of critical path on completion date of project. Owners, consultants and contractors often meet weekly for discussion. Weekly meeting assist them for monitoring, updating and controlling the progress through project implementation. In addition, they can solve problems, evaluate current performance, and improve future work.

Most of owners, consultants and contractors use increase salary system in order to stimulate the construction time. This system will motivate employees and assist them to improve productivity and performance. This system is more important for employees than bonus in position or training systems because these systems are rarely affect on employees performance or their productivity. This is traced to cultural situation in the coastal region of Kenya. Training is required according to nature of project and its duration. In addition, training is an important for improvement and development overall performance of organization.

Microsoft project is the most important, famous and easy program used by owners, consultants and contractors for planning and scheduling. This program enables them to schedule, monitor, update and control many criteria of project such as time, cost and resources. In addition, most organizations in the Coastal region of Kenya are familiar with this program to be used for planning and scheduling processes. It is observed that Primavera program is an advanced and a complex program compared with Microsoft project. Construction organizations in the Coastal region of Kenya are not familiar with Primavera to be used or applied. However, Excel program has a limitation in usage for planning and scheduling.

Most owners, consultants and contractors agree that projects were delay because of the Coastal region of Kenya current political conditions. Continuous political tensions in the Coastal region of Kenya lead to rapid shortage of construction materials and delay of projects. This problems can be considered as an obstacle for time performance of construction projects. All owners consultants and contractors feel with such this sensitive problem in their projects.

**Cost management practice:**

Most owners and contractors give right and authority for line managers to manage the actual expenses. However, most of consultants do not give right and authority for line managers to manage the actual expenses. However, giving right and authority for line managers to manage the actual expenses depends mainly on the nature and size of works.

Most owners, consultants and contractors use software program in order to facilitate planning, monitoring and controlling project cost. The most programs used in construction organization in order to control and monitor cost are: Excel and Ms project. Most organizations are familiar with these software programs because they are easy to be used and have different facilities and functions to control the cost. Most owners, consultants and contractors use current quotation for labor, material and equipment cost to estimate the construction cost for

the project. This method is more accurate for cost estimation than others because it depends on current situation. However, historical data sometimes is interested to be used for owners, consultants and contractors because an experience can assist for quick evaluation and estimation.

Most consultants and contractors stated that the project was sometimes delay by late payment from the owner. In the Coastal region of Kenya, contractors usually suffer from this problem. Delay in payment from owner to contractor lead to delay of contractors' performance and cause problem in time performance. This may also lead to disputes and claims between owner and contractor of project. All of that will affect the overall performance of project which has been implemented.

Most owners, consultants and contractors agree that actual cost of executed projects was more than the estimated cost because of the Coastal region of Kenya political conditions. Continuous political tensions in the Coastal region of Kenya lead to rapid shortage of construction materials and escalation of construction material prices. This escalation of material prices affect the liquidity and cost performance of projects.

**Owner satisfaction management practice:**

Generally, it is obtained that most of consultants and contractors projects are high satisfied by the owners in the Coastal region of Kenya. In addition, some contractors and consultants projects are medium satisfied by the owner because of many reasons such as: poor quality, non conformance to specification, problems in cost and time performance, weak coordination or relationship between projects participants, occurrence of accidents through implementation stage, claims and disputes. In addition, consultants and contractors projects usually have few defects with low impact on the owner satisfaction.

**Recommendation**

**Training programs**

It is recommended to develop human resources in the construction industry through proper and continuous training programs about construction projects performance.

These programs can update their knowledge and can assist them to be more familiar with project management techniques and processes. In addition, it is preferred to develop and improve the managerial skills of engineers in order to improve on performance of construction projects. All of that can be implemented by offering effective and efficient training courses in scheduling, time, cost, quality, safety, productivity, information systems and management of human resources. These continuous training courses will lead to success performance through construction projects such as availability of resources as planned through project duration, availability of personals with high experience and qualification, proper quality of equipments and raw materials used in project. In addition, training system will assists for improvement of construction time performance.

**Recommendations for construction organizations**

It is necessary for construction organizations in the Coastal region of Kenya to evaluate both of market share and liquidity before implementation of any construction project based on the economic situation in region. This will assist organizations to perform projects successfully and strongly. In addition, it is recommended that a new approach to contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors. It is necessary to establish proper industry regulations and appropriate mechanism for contractors' enforcement. A structured methodology and technique should be identified to overcome the effect of local political and economic situations on the performance of construction projects in the Coastal region of Kenya.

In addition, construction organizations are recommended to evaluate project overtime through project construction in order to enhance and improve time and cost performance of projects. Planned time for project implementation should be more suitable for practice. Time needed to implement variation orders and to rectify defects should be estimated and scheduled without affecting project time completion. Having regular meeting among project participants can also enhance performance. Construction organizations should have different incentive systems in order to improve overall performance. In addition, they should have continuous safety training and meeting in order to apply safety factors and achieve better performance.

**Recommendations for owners**

Owners are recommended to facilitate payment to contractors in order to overcome delay, disputes and claims. All managerial levels should be participated with sensitive and important decision-making. Continuous coordination and relationship between project participants are required through project life cycle in order to solve problems and develop project performance. It is recommended to minimize disputes between owner and project parties. Employees in construction industries should be more interested with belonging to work to productivity and time performance of project.

**Recommendations for consultants**

Consultants should be more interested with design cost by using multi criteria analysis and choosing the most economic criteria in order to improve their performance and to increase owners satisfaction. In addition, consultants are recommended to facilitate and quicken orders delivered to contractors to obtain better time performance and to minimize disputes and claims.

**Recommendations for contractors**

Contractors should not increase the number of projects that cannot be performed successfully. In addition, contractors should consider political and business environment risk in their cost estimation in order to overcome delay because of closures and materials shortage. There should be adequate contingency allowance in order to cover increase in material cost. A proper motivation and safety systems should the Coastal region of Kenya. More applications of health and safety factors are necessary to overcome problems of safety performance.

Contractors are recommended to minimize waste rate through project implementation in order to improve cost performance. They should be more interested with conformance to project specification to overcome disputes, time and cost performance problems. Quality materials should be more interested with contractors to improve cost, time and quality performance. This can be done by applying quality trainings and

meetings which are necessary for performance improvement. Contractors are recommended to be more interested with sequencing of work according to schedule. In addition, contractors should have a cost engineer in their projects to control cost successfully.

**Recommendations for future research**

It is recommended to develop performance measurement framework and modeling system in order to measure performance of construction organizations and projects. In addition, it is recommended to study and evaluate the most important factors as a case study of construction projects in the Coastal region of Kenya.

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**Correlation coefficient of each item of cost factors and the total of this part**

| No | Cost Factors | Correlation coefficient | P-Value (Sig.) |
|---|---|---|---|
| **1** | Profit rate of project | .543 | 0.000** |
| 2 | Overhead percentage of project | .687 | 0.000** |
| 3 | Project design cost | .563 | 0.000** |
| 4 | Material and equipment cost | .373 | 0.000** |
| 5 | Project labor cost | .446 | 0.000** |
| 6 | Project overtime cost | .639 | 0.000** |
| 7 | Motivation cost | .696 | 0.000** |
| 8 | Cost of rework | .689 | 0.000** |
| 9 | Cost of variation orders | .635 | 0.000** |
| 10 | Regular project budget update and cost control systems | .479 | 0.000** |
| 11 | Escalation of material prices | .440 | 0.000** |
| 12 | Differentiation of coins prices | .437 | 0.000** |

**Correlation significance at 0.01 level

**Correlation coefficient of each item of time factors and the total of this part**

| No. | Time factors | Correlation Coefficient | P-Value (Sig.) |
|---|---|---|---|
| 1 | Planned time for project | .539 | 0.000** |
| 2 | Time needed to implement variation orders and Time needed to rectify defects | .706 | 0.000** |
| 3 | Average delay in claim approval and payment approval owner to contractor | .577 | 0.000** |
| 4 | Availability of resources as planned through project duration | .543 | 0.000** |

**Correlation significance at 0.01 level

**Correlation coefficient of each item of quality factors and the total of this part**

| No. | Quality factors | Correlation Coefficient | P-Value (Sig.) |
|---|---|---|---|
| 1 | Conformance to specification | .755 | 0.000** |
| 2 | Availability of personals with high experience and qualification | .795 | 0.000** |
| 3 | Quality of equipments and raw materials in project | .755 | 0.000** |
| 4 | Participation of managerial levels with decision making | .565 | 0.000** |
| 5 | Quality assessment system in Organization and Quality training/meeting | .763 | 0.000** |

**Correlation significance at 0.01 level

**Correlation coefficient of each item of productivity factors and the total of this part**

| No. | Productivity factors | Correlation Coefficient | P-Value (Sig.) |
|---|---|---|---|
| 1 | Project complexity | .669 | 0.000** |
| 2 | Number of new projects / year | .609 | 0.000** |
| 3 | Management-labor relationship | .722 | 0.000** |
| 4 | Absenteeism rate through project | .778 | 0.000** |
| 5 | Sequencing of work according to Schedule | .731 | 0.000** |

**Correlation significance at 0.01 level

**Correlation coefficient of each item of client satisfaction factors and the total of this part**

| No | Client Satisfaction factors | Correlation Coefficient | P-Value (Sig.) |
|---|---|---|---|
| 1 | Information coordination between owner and project parties | .511 | 0.000** |
| 2 | Leadership skills for project Manager /Owner | .606 | 0.000** |
| 3 | Number of disputes between owner and project parties | .681 | 0.000** |

**Correlation significance at 0.01 level

**Correlation coefficient of each item of regular and community satisfaction factors and the total of this part**

| No | Regular and community satisfaction factors | Correlation Coefficient | P-Value (Sig.) |
|---|---|---|---|
| 1 | Cost of compliance to regulators owner and project parties owner and project parties | .869 | 0.000** |
| 2 | Number of non compliance to regulation | .837 | 0.000** |
| 3 | Quality and availability of regulator documentation | .890 | 0.000** |
| 4 | Neighbors and site conditions Problems | .678 | 0.000** |

**Correlation significance at 0.01 level

**Correlation coefficient of each item of people factors and the total of this part**

| No. | People factors | Correlation Coefficient | P-Value (Sig.) |
|---|---|---|---|
| 1 | Employee attitudes in project | .847 | 0.000** |
| 2 | Recruitment and competence development between employees | .829 | 0.000** |
| 3 | Employees motivation Belonging to work | .881 | 0.000** |

**Correlation significance at 0.01 level

**Correlation coefficient of each item of environment factors and the total of this part**

| No. | Environment factors | Correlation Coefficient | P-Value (Sig.) |
|---|---|---|---|
| 1 | Air quality | .874 | 0.000** |
| 2 | Noise level | .810 | 0.000** |
| 3 | Wastes around the site | .866 | 0.000** |
| 4 | Climate condition in the site | .777 | 0.000** |

**Correlation significance at 0.01 level