# ADDIS ABABA UNIVERSITY

# SCHOOL OF GRADUATE STUDIES


## Comparative Analysis on Factors Affecting Performance of Local and International Contractors in Road Projects Administered by Ethiopian Roads Authority

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**A thesis submitted to the School of Graduate Studies of Addis Ababa University in partial fulfillment of the requirements for the Degree of Master of Science in Construction Technology and Management.**

**November 2016**


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## COMPARATIVE ANALYSIS ON FACTORS AFFECTING PERFORMANCE OF LOCAL AND INTERNATIONAL CONTRACTORS IN ROAD PROJECTS ADMINISTERED BY ETHIOPIAN ROADS AUTHORITY

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## DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university. All sources of materials used for the thesis have been duly acknowledged.

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Azeb Getahun
November 2016, Addis Ababa, Ethiopia.

## *ABSTRACT*

Ethiopian Roads Authority (ERA) representing the Government of Ethiopia manages road construction projects in Ethiopia. Local and International contractors are carrying out substantial portion of these road construction projects. However, most of the road projects are suffering from factors negatively affecting the performance of both Local and International contractors. Identifying the major factors affecting the performance of Local and International contractors plays essential role in devising appropriate measures to improve the performance of contractors to complete projects within the desired performance requirements.

A total of (37) factors that influence performance of Local and International contractors and a total of (15) factors that particularly influence the performance of International contractors were identified based on the literature review. The identified factors were categorized into groups depending on types of performance process and statistical analyses of their significance were carried out based on the questionnaire survey with senior professionals from both groups of contractors.

The outcome of these analyses showed that all respondents agreed that the performance of the contractors were influenced by all the factors indicated in the questionnaire and the top ten factors which significantly affect performance were then identified.

Recommendation towards improvement of the current performance for Local and International contractors and ERA are illustrated, which include: Local contractors shall ensure that they have enough capital base and proper cash flow and capacity building of high level professionals and intermediate skilled personnel to be given prior attention; International contractors shall have project knowledge of the specific country they plan to work with; and ERA shall establish independent right-of-way team and stipulate the approval of claims with the time-frame so as to facilitate the progress of works.

Future research is recommended, focus in studying the effect of the identified performance factors both on the contractors and road projects administered by ERA.


**Key words**: *Construction Industry, Contractors performance, International construction, Performance, Project performance factors.*

## *ABBREVIATION*

| | | |
|---|---|---|
| AFDB | = | African Development Bank |
| BADEA | = | Arab Bank for Development in Africa |
| BPM | = | Building Project Management |
| BPR | = | Business Process Re-Engineering |
| CCCC | = | China Communication Construction Company |
| CGCOC | = | CGC Overseas |
| CICs | = | Chinese International contractors |
| CSF | = | Critical Success Factor |
| DBST | = | Double Bituminous Surface Treatment |
| DFIs | = | Development Finance Institutions |
| DMAIC | = | Define, Measure, Analyze, Improve and Control |
| ECAs | = | Export Credit Agencies |
| ERA | = | Ethiopian Roads Authority |
| ERCC | = | Ethiopian Road Construction Corporation |
| ETB | = | Ethiopian Birr |
| FIDIC | = | International Federation of Consulting Engineers |
| GDP | = | Gross Domestic Product |
| GOE | = | Government of Ethiopia |
| ICB | = | International Competitive Bidding |
| IDA | = | International Development Association |
| IT | = | Information Technology |
| KPIs | = | Key Performance Indicators |
| MEC | = | Metal Engineering Corporation |

| | | |
|---|---|---|
| MSc | = | Master of Science |
| NDF | = | Non – Deliverable Forward |
| OFID | = | OPEC Fund for International Development |
| PPMS | = | Project Management Monitoring System |
| RSDP | = | Road Sector Development Program |
| ROW | = | Right of Way |
| ROWCP | = | Right of Way Clearance Plan |
| RRAs | = | Regional Road Authorities |
| UK | = | United Kingdom |
| URRAP | = | Universal Rural Road Access Program |
| USD | = | United States Dollar |

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# 1. INTRODUCTION

## *1.1 GENERAL OVERVIEW*

The Federal Democratic Republic of Ethiopia, a landlocked African country, covers a territory of 1.133 million square km, has a population of 99.6 million composed of 80 ethnic groups, and has a GDP per head of $550 per person (Ethiopia Overview, 2016).

The Ethiopian Roads Authority (ERA) is a legally autonomous organization established on January 26, 1951. Ever since its establishment, the Authority has gone through a series of structural changes, the most recent one being in July 2011 by the Council of Ministers Regulation No. 247/2011. This regulation agrees with the split of the operational and regulatory wings as two independent entities, leaving ERA to focus on Road Network Development and Asset Management rather than construction and maintenance of same.

Hence, the main objectives of ERA, as stated in the aforementioned regulation, are to develop and administer roads, create conducive conditions for the coordinated development of roads network, and ensure the maintenance of standards in road construction.

In the context of Ethiopia's geography, pattern of settlement and economic activity, transport plays a vital role in facilitating economic development. In particular, it is road transport that provides the means for the movement of people, utilization of land and natural resources, improved agricultural production and marketing, access to social services, and opportunities for sustainable growth.

Recognizing the importance of the road transport in supporting social and economic growth and its role as a catalyst to meet poverty reduction targets, the Government of Ethiopia has placed increased emphasis on improvement of the quality and size of road infrastructure in the country. To address constraints in the road sector, mainly low road coverage and poor condition of the road network the Government formulated the Road Sector Development Program (RSDP) in 1997. The RSDP has been implemented over a period of fifteen years and in four separate phases.

Over fifteen years of RSDP physical works consisting of rehabilitation and upgrading of trunk and link roads, construction of new link main access roads, construction of rural roads and

community roads and maintenance of federal and regional road has been carried out by ERA, RRAs, wereda road desks, the community and municipalities. Also over fifteen years of RSDP series of policy and institutional reforms have been implemented in the sector. Government of Ethiopia has been a major financer of RSDP followed by the Road Fund Office. Donors have also supported RSDP in the past fifteen years, including the World Bank, European Union, ADB, NDF, BADEA, OFID, the Governments of Japan, Germany, U.K. and Ireland. The Saudi Fund for Development, the Kuwait Fund and the Government of China has also joined the financing partnership since RSDP II. The recent partner which joined this effort is Abu Dhabi Fund.

Over the fifteen years of RSDP, physical works have been undertaken on a total of 81363km of roads excluding routine maintenance work and community roads. The total budget for the planned works during this period amounted to ETB 107.8 billion (USD 6.4 billion). The total amount disbursed in the same period, is 101% of the planned target (ERA, 2013).

The impact of the program in building the capacity of the domestic construction industry is encouraging. Specifically, participation of the local contracting industry has increased, in terms of both the value and number of projects, over the last fifteen years of the RSDP. Some Local contractors are now taking relatively bigger contracts.

International contractors are attracted to Ethiopia for its political stability, consistent growth, and relatively good legal system as compared to many other African states. The majority of the International contractors are Chinese companies. They work mostly on infrastructure construction; a significant proportion engages specifically in road construction.

In many respects these Road Projects are successful, however observations show that there is a difference in the rate of work completion, level of construction quality and cost at completion between Local and International contractors.

If left unaddressed, this challenge will endanger the long-term success of the Authority to be a safe, effective, efficient and fully integrated Road Authority which will best meet the needs of all at improving levels of service, levels of Local contractors and reducing costs of living for economic and social development, whilst being environmentally and economically sustainable (ERA, 2013).

In this thesis, factors affecting the performance of International contractors and Local contractors is assessed and compared against each other to gain insight into their ways of performance, and make judgements about, their effectivness and efficiency. Their progress is measured in meeting strategic goals and outcomes, gather and analyse performace data and then to drive improvement and successflly measure the utilization of actions into outcomes.

The study begins with reviewing literatures in the area of performance measurement which are generally identified in different research findings. It then administers a survey on factors affecting performance of International contractors and Local contractors in Ethiopian Roads Authority. It then analyzes the collected data to assess the actual condition in both group of Contractors and the causes for the conditions that exist. Finally it identifies best practices used by Contractors in Road projects and will recommend appropriate measures to be taken by the contractors and by ERA.

The result of the Performace measures will support managerial decision making by providing useful information on how efficient and effective the contractors are, if improvements are necessary, identification of potential risks, and determination of customer and stakeholder satisfaction.

## *1.2 STAEMENT OF THE PROBLEM*

The difference in performance between road projects carried out by International contractors and Local contractors is becoming a challenge for Ethiopian Roads Authority. According to observations, some road projects which are carried out by International contractors are completed within the stipulated time frame, allocated budget and expected quality of work. Whereas more of road projects carried out by Local contractors are completed far beyond the stipulated time frame, with high cost overrun and with less quality of the work.

This thesis particularly focuses on Identifying and Comparing Critical Factors which are affecting the Performance of Local and International contractors like: time, cost, quality, client satisfaction which are identified as real causes for the differences and problem.

## *1.3 OBJECTIVES*

The objective of this research is:

- To look into critical factors affecting performance of Local and International contactors in Road Projects in ERA,
- To identify major critical factors which affect performance of Local and International contractors,
- To evaluate critical factors affecting the Performance of Local and International contractors, and finally,
- To formulate recommendations to improve performance of construction projects based on the identified factors.

## *1.4 SCOPE OF THE RESEARCH*

The scope of the thesis is limited to;

- International contractors who perform road projects in Ethiopia.
- Local contractors of Grade 1 who perform comparable project size as those of International contractors working on road projects administered by ERA.
- RSDP IV- Period July 2010 to June 2015 (5 years plan).

## *1.5 POSSIBLE OUTCOMES OF THE RESEARCH*

Finding of the thesis will help identify those major factors which are affecting performance of Local and International contractors working on road projects administered by ERA. Main differences of performace measurements between Local and International contractors will be outlined and possible solutions and best lessons gained will be proposed.

Local and International contractors and ERA could improve their performance by applying the lessons and knowledge gained from the recommendation.

# 2. LITERATURE REVIEW

## *2.1 GENERAL OVERVIEW*

The construction industry is vital for the development of any nation. In many ways, the pace of the economic growth of any nation can be measured by the development of physical infrastructures, such as buildings, roads, rail ways, hydropower stations and bridges.

Construction project development involves numerous parties, various processes, different phases and stages of work and a great deal of input from both the public and private sectors, with the major aim being to bring the project to a successful conclusion.

The level of success in carrying out construction project development activities will depend heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risk management, the business environment, and economic and political stability.

As construction is becoming more complex, a more sophisticated approach is necessary to deal with initiating, planning, financing, designing, approving, implementing and completing a project. The common assessment of the success of construction projects is that they are delivered on time, to budget, to technical specification and meet client satisfaction.

However, the criteria for success are in fact much wider, incorporating the performance of the stakeholders, evaluating their contributions and understanding their expectations. A stakeholder is an individual or group, inside or outside the construction project, which has a stake in, or can influence, the construction performance. Construction projects potentially can have different sets of stakeholders as: client, consultant, contractor, supplier, end-user and the community. Successful construction project performance is achieved, when stakeholders meet their requirements, individually and collectively.

Construction projects involve a great deal of time and capital, so effective construction project management skills are required if the projects are to be completed within the established time line to meet cost limitations and quality requirements.

In the construction industry, staying cost effective and competitive means that companies must have core competencies for coordinating the job sites, controlling costs, and managing risk at their construction sites (Sullivan, 2013).

### 2.1.1 Definitions of basic terms and concepts

*Comparative analysis:*

Comparative analysis is a study that compares and contrasts two entities: two construction companies, two road projects, two dams, etc. The study can be done to find the crucial differences between two very similar things or the similarities between two things that appear to be different on the surface.

The basic approach starts with establishing three elements: a frame of reference, or the set of criteria used to measure; grounds for comparison, such as why the particular two were chosen; and the point of the argument, such as why one should choose one of the two things studied over the other.

*Contractor*

Independent entity that agrees to furnish certain number or quantity of goods, material, equipment, personnel, and/or services that meet or exceed stated requirements or specifications, at a mutually agreed upon price and within a specified timeframe to another independent entity called principal, or project owner.

*International contractors*

International contractors are contractors who perform construction works outside their country of origin.

*Local contractors*

Local contractors are contractors who perform construction works inside their country of origin.

*International construction projects*

International construction projects are those projects in which the contractor, the lead consultant, or the employer is not of the same residence, and at least one of them is working outside his or her country of origin.

*Performance:*

The accomplishment of a given task measured against preset known standards of accuracy, completeness, cost, and speed. In a contract, performance is deemed to be the fulfillment of an obligation, in a manner that releases the performer from all liabilities under the contract.

*Performance indicator(s):*

A particular value or characteristic used to measure output or outcome. These are parameters useful for determining the degree to which an organization has achieved its goals. A quantifiable expression used to observe and track the status of a process. The operational information that is indicative of the performance or condition of a facility, group of facilities, or site.

*Performance management:*

The use of performance measurement information to help set agreed-upon performance goals, allocate and prioritize resources, inform managers to either confirm or change current policy or program directions to meet those goals, and report on the success in meeting those goals.

*Performance measurement:*

A process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources are transformed into goods and services (outputs), the quality of those outputs (how well they are delivered to clients and the extent to which clients are satisfied) and outcomes (the results of a program activity compared to its intended purpose).

*Infrastructure*

Infrastructure is the basic physical and organizational structure needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function. It can be generally defined as the set of interconnected structural elements that provide a framework supporting an entire structure of development. It is an important term for judging a country or region's development.

The term typically refers to the technical structures that support a society, such as roads, bridges, tunnels, water supply, sewers, electrical, telecommunications, and so forth, and can be defined as ‘the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions.’

### 2.1.2 Nature of the Construction Industry

In ancient time, construction and architectural wonders were created and are considered now the wonders of the world, such as the pyramids of Egypt, the Great Wall of China, Taj Mahal and also the Eiffel tower in Paris. During the eighties the construction industry expanded and its total annual value around the world was about 1.5 trillion dollars. While during this century the construction activity is revolutionized to include high rise buildings, infrastructure facilities, dams and irrigation works.

The construction industry is dynamic in nature as it changes constantly with the developments of new business methods and technologies. This constant change increases the uncertainties in technology, budgets, and development process. The main characteristics in the construction industry are the complexity of the construction process, the long time period taken by the project to be completed, the involvement and integration of different specialties, the uncertainty and risk involved in the construction industry and also the production of unique projects that is witnessed widely in the past years due to globalization. Thus, construction companies should adopt and develop appropriate strategies to decrease the uncertainties of facing extraordinary changes, and achieve the highest success percentage in their business.

Construction industry has its own position in the national economy of each country, as it was the main reason of the economic growth of some countries such as United States and China (El-sokhn, 2014).

The high levels of construction activity are usually associated by national prosperity. The importance of the industry is not for its final product only as it provides them with all the essential public infrastructure and private structure; it is also for the employment of large number of people directly and indirectly. Moreover, other industries are activated during the construction process such as to the steel industry, the concrete industry, etc. Thus, the construction industry has a great effect on the economy of the country or a region during the construction process (El-sokhn, 2014).

### 2.1.3 Construction Projects

A project is a temporary endeavor undertaken to create a unique product, service, or result.

Temporary means that every project has a definite beginning and a definite end. The end is reached when the project's objectives have been achieved, or it becomes clear that the project objectives will not or cannot be met, or the end for the project no longer exists and the project is terminated. Temporary does not necessarily mean short in duration; many projects last for several years. In every case however duration of a project is finite.

Unique products, services, or results means a project creates unique deliverables, which are products, services, or results.

Project can create:

- A product or artifact that is produced, is quantifiable, and can be either an end item in itself or a component item
- A capability to perform a service, such as business functions supporting production or distribution
- A result, such as outcomes or documents.

Uniqueness is an important characteristic of project deliverables. For example, many thousands of office buildings have been developed, but each individual facility is unique- having different owner, different design, different location, different contractors, and so on.

Progressive elaboration is a characteristic of projects that accompanies the concepts of temporary and unique. Progressive elaboration means developing in steps, and continuing by increments. For example, the project scope will be broadly described early in the project and made more explicit and detailed as the project team develops a better and more complete understanding of the objective and deliverables (PMI, 2004).

### 2.1.4 Stages of the Construction Project

Construction project is a complex, unique and one-time effort, as numerous of people, activities and requirements are involved to achieve the project goals. It is restricted by time, budget and quality and performance specifications to satisfy the customer needs. People involved in the

construction process should be familiar with the stages of the process, as the project team works together in coordination seeking successful completion of the project.

Each process in the project is unique and need special management techniques and skills to monitor and keep the project on track. The design and construction process consists of linear path from the initial concept of the project until its occupancy. The project develops through the stages on step at a time till it arrives to be successfully delivered. These stages are design, bidding stage, pre-construction, procurement, construction, and post-construction (El-sokhn, 2014).

### 2.1.5 Construction Project Players

The builder in any construction project is a collaborative team with various skills and expertise. This team includes many players who have valuable contribution to the project and adding to its complexity at the same time. It is vital for the project manager to identify the players involved in the construction process, their roles and responsibilities and the risk associated to their involvement. The understanding of these relationship increases on the appreciation of the management function in construction (Jackson, 2004).

The players in the construction project are divided into primary players and secondary players. The most important players in any construction project are the owner, the designer and the contractor. These are the primary players of any construction project, as each of them provides different services to fulfill the project objectives.

On the other hand, the secondary players are as important as the primary players, as they have power and influence on the construction process and its outcome and they cannot be controlled by the primary players. They can be divided into three layers. The first layer includes subcontractors, material supplier and equipment vendor. The second layer includes insurance companies, building codes officials, zoning, labor unions and manufactures. Besides, the third layer includes local government, federal government, trade associations and banks. The last two layers have no contractual connection or obligation to any of the primary layers, but they influence the construction project on a regular basis. Although their effects are not always immediate, they can have a great impact over the whole industry (Jackson, 2004).

### 2.1.6 International Construction Projects

Projections of increased population growth, urbanization and needed infrastructure around the world provide opportunities for International firms to expand internationally. For instance, demographers expect over a billion more inhabitants on earth in the next decade, particularly in emerging market countries. This growth will require increased spending on infrastructure and facilities to meet people's basic needs while allowing for economic growth and expansion. Many firms are responding to these opportunities and seeing their revenues increase.

As exciting as these predictions and opportunities appear, international projects also involve many uncertainties and risks not found on domestic construction projects. These projects engage participants from differing backgrounds and cultures who work together in unfamiliar locations, increasing risks and costs when doing business abroad. Firms entering foreign markets are therefore thought to be at a disadvantage due to their lack of familiarity with the local environment, which is often termed the 'liability of foreignness'. Understanding these differences and fine distinction in different countries where they plan to work is therefore expected to reduce these risks, thereby increasing the success of global projects.

Among the important International project knowledge's required by these International contractors include: social norms, expectations and local preferences, cultural issues, approval processes, operating law; material and labor quality, availability and cost; logistics; followed closely by work practices and approval processes, differences encountered in work practices, cultural differences, design and construction standards and permit processes (Levitt, 2009).

*Social Norms, Expectations and Local Preferen*ces include everything from how someone is expected to act in the local context- for example, at meetings and in introductions to people, to local preferences for office design and layout. Obviously, this can have a tremendous impact on the success of a development. If it is not accepted by the local population, the development will be a failure due to lack of interest and leasing opportunities.

*The Cultural* code includes everything from cultural beliefs to different concepts and meanings found in different areas to cultural disputes.

*Approval processes* fall between categories requiring not only regulative knowledge, but also knowledge of the norms. For instance, the process of obtaining approvals is often not transparent and requires prior experience or intimate knowledge of the party granting approval.

*Operating laws* included multiple daughter codes of labor laws, taxation, customs, company registration, tax laws, money repatriation, insurance policies, land laws and contractual differences. The most noted of these laws was labor laws, which focus on the requirements to hire local labor, the ability to mobilize international labor (which often addresses which nationalities are allowed to work there) and the availability of work permits.

The operating laws will influence the amount of labor and equipment required from the local area, and from this requirement comes the necessity to understand *the cost, quality and availability of labor, materials and parts within an area*. This can include available equipment.

*Logistics* is also of utmost importance to contractors. They need to know how they will ship and transport resources, mobilize at the site location, work with currency and banks, ensure safety and security and set up camps for workers.

*Design and Construction Standards and Permit Processes* are important for engineers in order to adhere to specified standards and create a design that meets local requirements (Levitt, 2009).

International construction projects are projects in which the contractor, the lead consultant and the employer are not of the same nationality and at least one of them is working outside his country of origin. Governments procured projects are considered 'international' in circumstances where the main contractor is a foreign company, or where the main contractor is a branch or subsidiary of a foreign company.

The structure of major International projects is typically quite complex, often involving many different international companies. It is common for a procurer or employer to be local, the main contractor to be a foreign company, major plant suppliers or nominated subcontractors being from a different country, other subcontractors and suppliers being a combination of local and international companies, financing provided by international or offshore banks, and the professional consultancy firms also being domiciled in a jurisdiction different to that of the site.

Within the teams of each organization, it is also common to find a mix of different nationalities and languages, particularly in developing markets or 'expat heavy' regions, such as the Middle

East. All of these international components are also common in private projects or developments, with the additional possibility that the developer or procurer could also be a foreign entity. It is apparent that there is a significant range of factors that can make a construction project 'international' in nature.

The growth of construction projects in developing markets (combined with accelerating urbanization and a growing middle class) has created a certain momentum that is driving construction investment in sectors necessary to service developing markets growth. This effect is bringing additional, 'associated' construction projects to market in both developing and developed markets.

The nature of construction makes it an inherently risky commercial enterprise. One need only consider issues such as delayed contract periods, complicated processes, environmental factors, financial intensity and dynamic organization structures to name a few of the common risk issues.

Construction risk can typically be separated into two main classes, project delivery risk and jurisdictional risk. Every project has both types of risks. However, jurisdictional risks on domestic projects are not often analyzed or consciously mitigated on a project by project basis, as they are often considered generic 'business risks' and mitigated through existing corporate policies.

Project delivery risks are risks that relate to the delivery of a specific project and to the financing and construction of a specific asset. These risks include things such as counter-party risk, site and ground condition risks, construction contract risk profile, the availability of financing and bankability of a project, materials price escalation risks and the like.

Jurisdiction risks are risks that relate more generally to the jurisdiction within which the project is to be delivered and the asset constructed. While these are not directly connected to a specific project, the consequence of such a risk occurring could weigh heavily on a project. Jurisdictional risks include things like legal entity establishment and licensing procedures, political and social stability, exchange rate risk, currency controls, availability of dispute resolution forums and enforcement issues, to name a few.

On international projects, jurisdictional risks can be very significant. When looking to perform works in a foreign country, the jurisdictional risks can include economic barriers to entering the

market, tax and tariff issues, currency risks, insurance risks, risks of expropriation or nationalization, political and social instability, relationships with the ruling government, applicable social, business and religious customs, dispute resolution and enforcement options, governing law risks, adequacy of surrounding infrastructure, approvals and permits issues, importation and customs issues, payment risks and customs, bonding and security customs, and labor issues including visa issues and national labor participation. While it is possible for almost any of these risk issues to arise in a domestic project, the familiarity with the jurisdiction and the longevity of business in that market (combined with established corporate policies to address domestic jurisdictional risk) tends to mitigate jurisdictional risks on domestic projects (Sachin Kerur, 2008).

## *2.2 PROJECT SUCCESS AND FAILURE IN THE CONSTRUCTION INDUSTRY*

The construction process appears as ordered, linear phenomenon that can be organized, planned and managed easily. The high rate of failures that occur in the construction projects to be completed on budget and schedule clarifies that the nature of the construction process is not as ordered and predictable as it may appear. The construction process is a complex, nonlinear and dynamic phenomenon that may exists on the edge of chaos sometimes. Therefore, the construction projects are rich in plan failure, delays and cost overruns more than in successes.

Sometimes in case of the acceptance of the outcomes by the stakeholders, higher cost and delays must be tolerable. This clarify that the success and failure criteria changes from project to project depending on participants, scope, project size, technological implications and many other factors. Therefore, it is vital for project managers and researchers to gain better understanding about success and failure of construction projects and to identify all the factors that may oppose the project success and leads to failure. Eventually, approve a certain criteria to be used to measure the success of different projects (Jari, 2013).

‘Success’ and ‘failure’ are two sides of the same coin. The understanding and exploration of failure helps in recognizing and defining success. In spite of large project failure percentage, managers avoid discussing failure cases or accessing any related information and try to hide them. The fear of harming the reputation of the parties involved avoids them from sharing their failure cases.

Being successful is the ultimate goal of every business activity, as well as the construction industry in order to survive in the construction environment. Over the years, many practitioners and academics attempted to understand and specify the factors of project failure or success, but it was problematic.

- The first reason is due to the unclearness of project success and failure measurements because the parties who are involved in the project perceive the concept differently.
- The second reason is that the list of success and failure factors varies in the literature.

Several factors were tabulated individually, rather than being grouped according to certain criteria to help analyze the interaction between the factors and their effect. Although many factors do not affect the project directly, it can affect the project badly when it is combined with other factors during certain stage of the project.

Failures occurred at many projects over the last decades. The search for the success and failure factors had started before 1990s. Although the knowledge in this area then was far from perfection, similarities exist among the literature. The factors that most of the researchers agreed on were poor definition of project objectives and goals, and managerial issues. The 20th century witnessed the growth of construction industry all over the world. Therefore, the success and failure factors have increased to include the teamwork, communication and leadership which affect the project objectives directly (Jari, 2013).

### 2.2.1 Project Management

Project management is the dynamic process that utilizes the appropriate resources of the organization in a controlled and structured manner, to achieve some clearly defined objectives identified as strategic needs. It is always conducted within a defined set of constraints.

Project management in the modern sense began in the 1950's although it has root further back in the latter years of the 19$^{th}$ century. The need for project management was driven by companies that realized the benefits of organizing work around projects, and critical need to communicate and coordinate work across departments and professions.

It is now over sixty years since the birth of project management and much of the early works have been collected and put together into formal methodologies. Although many different

methodologies exist, they all work with the same basic principles and good practices. Running projects successfully may seem simple, but sixty years on and project failures are still observed.

Projects go wrong for the same reason all the time. One of the biggest sins in project management is that of not learning the lesson of past projects. If one can learn to do this, project failure will be substantially reduced (Haughey, 2014).

Project Management is the process and activity of planning, organizing, motivating, and controlling resources, procedures and protocols to achieve specific goals in scientific or daily problems. A project is a temporary endeavor designed to produce a unique product, service or result. The temporary nature of projects stands in contrast with business as usual, which are repetitive, permanent, or semi-permanent functional activities to produce products or services. In practice, the management of these two systems is often quite different, and as such requires the development of distinct technical skills and management strategies.

The primary challenge of project management is to achieve all of the project goals and objectives while honoring the preconceived constraints. The primary constraints are scope, time, quality and budget. The secondary and more ambitious challenge is to optimize the allocation of necessary inputs and integrate them to meet pre-defined objectives.

Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is accomplished through the application and integration of the project management processes of initiating, planning, executing, monitoring and controlling and closing. The project manager is the person responsible for accomplishing the project objectives.

Managing a product includes:

- Identifying requirements
- Establishing clear and achievable objectives
- Balancing the competing demands for quality, scope, time and cost
- Adapting the specifications, plans, and approach to the different concerns and expectations of the various stakeholders.

Project managers often talk of a 'triple constraint'- project scope, time and cost- in managing project requirements. Project quality is affected by balancing these three factors. High quality projects deliver the required product, service or result within scope, on time, and within budget. The relationship among these factors is such that if any one of the three factors changes, at least one other factor is likely to be affected. Project managers also manage projects in response to uncertainty. Project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective (PMI, 2004).

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. A new approach was studied 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.

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.

Project management is only one of the many criteria upon which project performance is dependent; it is also arguably the most significant as people formulating the processes and systems who deliver the projects. 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. 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 (Shaban, 2008).

### 2.2.2 Project Management Competencies

The construction industry is a project-based industry since contractors survive and grow based on the success they achieve in their projects. Each construction project is unique but the managerial process is normally uniform across projects in a company. As the project is at the core of the construction business, project management competencies cannot be dissociated from overall company performance. Project management knowledge areas and skills have been investigated by many researchers. The most common of these factors adopted for this research are presented below.

- ***Schedule management*** is the competency of reasoning backward, since in the execution of all projects there is a target date to finish and deliver the job. It is a major enabler of the project to complete on time by the use of a series of processes. These processes are activity definition, sequencing, resource estimating, duration estimating, schedule development and schedule control. The timely accomplishment of a project is dependent on the experience of the project managers. A project manager has to be familiar with several parameters in a project environment for making accurate estimates on what may be the cause of a potential delay, or completion of the project on or ahead of schedule.
- ***Cost management*** activities include planning, estimating, budgeting, and controlling of the project. All these activities ensure the lowest possible overall project cost consistent with the owner's investment objectives.
- ***Quality management*** refers to the activities in an organization that determine quality policies, objectives, and responsibilities and represents solutions in response to the complex and non standardize able nature of construction projects that makes it difficult to manage quality. The processes of a quality management system are quality planning, quality assurance, and quality control. Even minor defects may require re-construction and may impair the facility's operations. Poor quality in constructed facilities can be corrected only at a cost and may cause delays. Construction companies are incrementally implementing TQM for improving customer satisfaction, obtaining better quality products and higher market share. The main needs in implementing TQM is the commitment of top management with leadership for the application of quality principles and moreover to change the quality culture.

- ***Human resources management*** is an inevitable dimension of project management since it is people who deliver projects. People are the predominant resource in an organization and there is a positive association between human resources management practices and achievement of outstanding performance. Organizing and managing the project team are the main duties of human resources management.
- ***Risk management*** processes and techniques have to be implemented properly in order to increase the performance of a project. These processes include planning, identification, analysis, responses, monitoring and control of a project. Considering the complex, dynamic and challenging nature of construction projects, risk in a construction project is unavoidable and affects productivity, performance, quality and budget significantly. However risk can be transferred, accepted, minimized, or shared. Proper management of risk has the potential to decrease the effects of unexpected events.
- ***Supply chain management*** is the network of different parties, processes and activities that produce products or services. The owner, consultants, contractor, subcontractors and suppliers constitute the supply chain in construction. Higher performance can be achieved by increasing the quality of communication between different parties and team operation among different parties. It has a strong correlation with project performance. A number of public sector construction initiatives in the UK identified the areas of underperformance amongst suppliers and government clients. These initiatives have emphasized the benefits of improving supply chain management.
- ***Claims management*** is of particular importance because the construction activity involves a large number of parties, an environment conducive to conflicts. Documentation, processing, monitoring and management of claims are a part of contract life cycle. Claims and disputes between construction owners, contractors and other participants can be avoided by clearly stated contractual terms, early non adversarial communication, and a good understanding of the causes of claims.
- ***Knowledge management*** is essential in accessing information relevant to best practices, lessons learned, historical and schedule data, and any other information necessary to run an efficient project. It can be defined as a vehicle fuel by the need for innovation and

improved business performance and client satisfaction. The capability of a company to cope with sophisticated projects is the result of a successful knowledge management.

- ***Health and safety management*** has a human dimension as accidents during the construction process can result in personal injuries and/or fatalities. Accidents also cause an increase in indirect costs such as the cost of insurance, inspection and conformance to regulations. Strict health and safety management regulations can reduce the number of accidents and accidents' effects on project costs. Important issues found to be as potential solutions to health and safety problems on site are the provision of safety booklets, provision of safety equipment, providing safety environment, appointing a trained safety representative on site, site safety, health planning and management, education and training of workers and supervisors, new technologies, federal regulation, workers' compensation law and medical monitoring.

### 2.2.3 Performance Management

Performance management is an agreement-based interactive control model. Its operational core is in the ability of the agreed parties to find the appropriate balance between the available resources and the results to be attained with them. The basic idea of performance management in operations is to balance resources and targets on the one hand and efficiency and quality on the other as well as possible and to ensure that the desired effects are cost-efficiently achieved.

Performance management is a process for setting goals and regularly checking progress toward achieving those goals. It includes activities that ensure organizational goals and objectives are consistently met in an effective and efficient manner. The overall goal of performance management is to ensure that an organization and its subsystems (processes, departments, teams, etc.), are optimally working together to achieve the results desired by the organization. Performance management has a wide variety of applications, such as, staff performance and business performance.

Because performance management strives to align all the subsystems to achieve results, the focus of performance management should also affect the management of an organization's performance overall. An organization can achieve the overall goal of effective performance management by continuously engaging in the following activities:

- Identifying and prioritizing desired results
- Establishing means to measure progress toward those results
- Setting standards for assessing how well results are achieved
- Tracking and measuring progress toward results
- Exchanging ongoing feedback among those individuals working to achieve results
- Periodically reviewing progress
- Reinforcing activities that achieve results, and
- Intervening to improve progress where needed (Management, 2006).

### 2.2.4 Performance Measurement

The purpose of performance measurement is to help organizations understand how decision-making processes or practices led to success or failure in the past and how that understanding can lead to future improvements. Key components of an effective performance measurement system include these:

- Clearly defined, actionable, and measurable goals that cascade from organizational mission to management and program levels;
- Cascading performance measures that can be used to measure how well mission, management, and program goals are being met;
- Established baselines from which progress toward the attainment of goals can be measured;
- Accurate, repeatable, and verifiable data; and
- Feedback systems to support continuous improvement of an organization's processes, practices, and results (National Research, 2005).

Performance measures are recognized as an important element of all Total Quality Management programs. Managers and supervisors directing the efforts of an organization or a group have a responsibility to know how, when, and where to institute a wide range of changes. These changes cannot be sensibly implemented without knowledge of the appropriate information upon which

they are based. In addition, among many organizations there is currently no standardized approach to developing and implementing performance measurement systems. As a result, performance measures have not been fully adapted to gauge the success of the various quality management programs practiced.

As a process, performance measurement is not simply concerned with collecting data associated with a predefined performance goal or standard. Performance measurement is better thought of as an overall management system involving prevention and detection aimed at achieving conformance of the work product or service to customer's requirements. Additionally, it is concerned with process optimization through increased efficiency and effectiveness of the process or product. These actions occur in a continuous cycle, allowing options for expansion and improvement of the work process or product as better techniques are discovered and implemented.

Performance measurement is primarily managing outcome, and one of its main purposes is to reduce or eliminate overall variation in the work product or process. The goal is to arrive at sound decision about actions affecting the product or process and its output.

The goal of Performance measurement system is to implement strategy. In setting up such systems, senior management selects measures that best represent the company's strategy. These measures can be seen as current and future critical success factors; if they are improved, the company has implemented its strategy. The strategy's success depends on its soundness. A performance measurement system is simply a mechanism that improves the likelihood the organization will implement its strategy successfully.

Comparing performance measurement systems to an instrument panel on a dashboard provides important insight about the mix of financial and nonfinancial measures needed in a management control system: A single measure cannot control a complex system; and too many critical measures make the system uncontrollably complex.

Performance measurement systems-like a dashboard and benchmarking-have a series of measures that provide information of many different processes. Some of these measures tell the manager what has happened. Other measures tell the manager what is happening.

Management theory and practice have long established a link between effective performance measures and effective management. The effectiveness of any given performance measure depends on how it will be used. For performance measures to have meaning and provide useful information, it is necessary to make comparisons. The comparisons may evaluate progress in achieving given goals or targets, assess trends in performance over time, or weigh the performance of one organization against another.

Performance measures used as a management tool need to be broadened to include input and process measures. One approach is to use an array or scorecard composed of multiple measures. The Balanced Scorecard is one such approach that assesses an organization and its programs from four different perspectives: customer, employee, process, and finance. 'The scorecard creates a holistic model of the strategy that allows all employees to see how they contribute to organizational success. It focuses change efforts. If the right objectives and measures are identified, successful implementation will likely occur.'

The objectives and process for construction and construction project management create a good environment for the effective use of benchmarking for measuring and improving performance. Benchmarking is a core component of continuous improvement programs.

*Overview of Project Effectiveness Measures in the Development of Construction Projects:*

The identification of project effectiveness measures are associated with project *'results'* in terms of accomplishing core business and project objectives, users' satisfaction and the use of the project. Ten possible indicators are compiled for effectiveness measures. These are: client satisfaction on service, user satisfaction with product, project effectiveness, project functionality, free from defects, value for money, profitability, absence of any legal claims and proceedings, learning and exploitation and generate positive reputation.

### 2.2.5 Benchmarks

Benchmarking is a key component of quality assurance and process improvement. The role of benchmarking in process improvement is similar to that of process improvement methodology. The methodology comprises five integrated steps: define measure, analyze, improve, and control (DMAIC). These steps are also central to the benchmarking process. Measuring, comparing to

competition, and identifying opportunities for improvements are the essence of benchmarking (National Research, 2005).

Benchmarking is the process of comparing a company's performance against a benchmark to assess current performance and generate a plan to drive improvement in order to drive performance towards the benchmark level.

Benchmarking is a method of improving performance in a systematic and logical way by measuring and comparing performance against others, and then using lessons learned from the best to make targeted improvements.

It involves answering the questions: -

- 'Who performs better?'
- 'Why are they better?'
- 'What actions do we need to take in order to improve our performance?'

Essentially, it is about looking at the way things are done and seeing why the performance is at a certain level, and using external comparators to improve performance. It uses data as evidence to identify who is performing better and using that understanding to drive improvement.

A recent surge of interest in Benchmarking has been encouraged by the publication of sets of national Key Performance Indicators. Beginning in 1999, these benchmarks allow companies to measure their performance simply and to set targets based on national performance data.

*Why do we need Benchmarking?*

Benchmarking is not just about measuring performance. It is about comparing with others to drive improvement.

Benchmarking is the process of comparing a company's performance against a benchmark to assess current performance and generate a plan to drive improvement in order to drive performance towards the benchmark level.

Benchmarking allows seeing how an organization is performing in a specific area, realistically comparing it, and finding ways of improving. This can affect all areas of the business from profitability, to staff satisfaction and retention.

A benchmark is a standard of excellence or achievement used to compare and measure against. It represents a best in class performance for a specific process that can be used to compare against in an effort to drive improvement. Some other definitions could be,

A ***benchmark*** is a reference or measurement standard used for comparison.

A ***benchmark*** is 'the best in class' performance achieved for a specific business process or activity. It is performance that has been achieved and can be used to establish improvement goals.

When comparing between processes, there are three main types of benchmark to compare against,

- *Internal* **–** an internal benchmark is concerned with comparing against the best within an organization, such as the performance between different construction projects. The data is easy to collect and practices more easily transferred, however it is unlikely to be a spur for large scale innovation.
- *Competitive* **–** a competitive benchmark is comparing processes between organizations within the same industry. This will be directly relevant to processes, and could provide large levels of innovation. However, it is often difficult to collect comparative benchmarks unless a member of Benchmarking Club. An example of a competitive benchmark may be Health and Safety records.
- *Generic* – a generic benchmark is concerned with comparing the same or similar process, but within a different industry. This may lead to high levels of innovation, but there may be difficulties in adapting practices from radically different industries. An example of a generic benchmark might be a comparison between construction and aerospace supply chain management techniques (Will Swan, 2004).

When benchmarking internally, organizations benchmark against their own projects. When benchmarking externally, organizations seek projects from other companies or from separate program offices for comparative analysis. External benchmarks are generally considered to provide the greater advantage; however, internal benchmarking can be useful where no external benchmarks are available. Internal benchmarks are often the starting point for quantitative process examination. Trends can be identified by examining these data over time, and the impact

of performance-improving processes can be assessed. External benchmarks provide the added advantage of comparing against competitors. Without external benchmarks, an organization and its managers may lack an understanding of what constitutes 'good' performance.

### 2.2.6 Key Performance Indicators

Key Performance Indicators are probably the most common benchmarking experience that construction companies and their clients will have encountered. Many companies are involved with implementing KPI systems, sometimes without understanding their place within the Rethinking Construction Agenda.

A Key Performance Indicator (KPI) is the measure of a process that is critical to the success of an organization. Many organizations use KPIs. There are a number of performance measures that define the success of a project or organization.

The construction industry KPIs allow the benchmarking of an organization against industry standard data published by the Construction Best Practice Program. The construction industry KPIs were first published in 1999, and are updated annually.

The three key elements are identified:

- Drivers – those things that have to be in place to drive improvement.
- Processes – the areas of process improvement
- Performance Targets – those key performance indicators.

The KPIs are essentially the evidence that culture change and process improvement are actually leading to positive change in terms of better performing projects and organizations.

Many clients, especially within the public sector are seeking to work with companies that demonstrate a commitment to continuous improvement. Often the implementations of forceful KPI systems are seen as a requirement for companies to win work. From the client perspective, KPIs provide a useful way to demonstrate wider project requirements, beyond time and cost issues.

The Headline KPIs are: Construction Cost, Construction Time, Predictability Cost, Predictability Time, Client Satisfaction Product, Client Satisfaction Service, Defects, Productivity, Profitability and Safety.

### 2.2.7 Earned Value Analysis

Earned Value analysis is a technique of performance measurement. Earned Value is a program management technique that uses "work in progress" to indicate what will happen to work in the future. Earned Value is an enhancement over traditional accounting progress measures. Traditional methods focus on planned accomplishment (expenditure) and actual costs. Earned Value goes one step further and examines actual accomplishment. This gives managers greater insight into potential risk areas. With clearer picture, managers can create risk mitigation plans based on actual cost, schedule and technical progress of the work. It is an "early warning" program/project management tool that enables managers to identify and control problems before they become challenging. It allows projects to be managed better – on time, on budget.

Feedback is critical to the success of any project. Timely and targeted feedback can enable project managers to identify problems early and make adjustments that can keep a project on time and on budget.

Earned Value Management (EVM) is one of the most effective performance measurement and feedback tool for managing projects. It enables managers to close the loop in the plan-do-check-act management cycle.

EVM has been called ''management with the lights on'' because it can help clearly and objectively illuminate where a project is and where it is going—as compared to where it was supposed to be and where it was supposed to be going. EVM uses the fundamental principle that patterns and trends in the past can be good predictors of the future.

EVM provides organizations with the methodology needed to integrate the management of project scope, schedule, and cost. EVM can play a crucial role in answering management questions that are critical to the success of every project, such as:

- Is the project ahead of or behind schedule?
- How efficiently is the time being used?
- When is the project likely to be completed?
- Is the project under or over our budget?
- How efficiently are resources being used?

- What is the remaining work likely to cost?
- What is the entire project likely to cost?
- How much will the project be under or over budget at the end?

If the application of EVM to a project reveals that the project is behind schedule or over budget, the project manager can use the EVM methodology to help identify:

- Where problems are occurring
- Whether the problems are critical or not
- What it will take to get the project back on track.

*EVM and the Project Management Process*

The effective use of EVM requires that it is used on projects where the principles of good project management are being applied. Project management is primarily a matter of planning, executing, and controlling work.

Project planning is mostly a matter of determining:

- What work must be done (scope) and in what pieces. (work breakdown structure)
- Who is going to perform and manage the work? (Responsibility assignment matrix)
- When the work is going to be done (schedule)
- How much labor, materials, and related resources the work is going to require (cost).

Project execution is primarily a matter of doing the planned work and keeping workers and managers informed.

Project control focuses mostly on monitoring and reporting the execution of project management plans related to scope, schedule, and cost, along with quality and risk.

In other words, project control is a process for keeping work performance and results within a tolerable range of the work plan.

As a performance management methodology, EVM adds some critical practices to the project management process. These practices occur primarily in the areas of project planning and control, and are related to the goal of measuring, analyzing, forecasting, and reporting cost and

schedule performance data for evaluation and action by workers, managers, and other key stakeholders (Nagrecha, 2002).

### 2.2.8 Factors Necessary for a Successful Construction Project

Project is a complex, non routine, one-time effort limited by time, budget and resource and performance specifications designed to meet customer needs. Attempts to understand the causes of project failure or success have proven problematic, despite attempt by many practitioners and academics over the years. Project demands have constantly increased over the last decade and have driven our society into a constantly changing environment.

Project management is a task derived from an organization that enables professional project managers to use their skills, tools and knowledge to plan, execute and control a unique project within a limited lifespan by meeting the specification requirements of the organization. Since the outcomes of the capital projects have strategic implications on the success and profitability of the business, the ability to deliver based on pre-determined objectives should be critical to the company's success. Project success can be defined as meeting the required expectation of the stakeholders and achieving its intended purpose. This can be attained by understanding what the end result would be, and then stating the deliverables of the project.

A construction project is completed through a combination of many events and interactions, planned or unplanned, over the life of a facility, with changing participants and processes in a constantly changing environment. Certain factors are more critical to a project’s success than others. These factors are called critical project success factors. Various project success factors have been identified by different researchers in different projects around the world. Community involvement, project objectives, technical innovation, uncertainty, politics, schedule duration urgency, financial contract, and implementation process were established as the critical success factors in projects. Success has been the ultimate goal of every business activity. It is highly important for the organizations to be successful in their businesses in order to survive in competitive business environments such as construction.

The construction industry is changing constantly with the developments of new business methods and technologies. Thus, constructions companies have to adopt and develop appropriate strategies to be more competitive in this industry and get success in their businesses. For a

project to be successful, it is essential to understand the project requirements right from the start and go for project planning which provides the right direction to project managers and their teams and execute the project accordingly. A successful project is one that is delivered on time and managed within the budget, Time, cost and quality have been recognized as 'triple constraint' or important elements of project success.

### 2.2.9 Project Success Classifications

- Project management success versus product success: Project success criteria consist of Project management success and Product success. Project management success covers meeting time, cost and quality objectives. On the other hand, product success deals with the ability of the project's final product to meet the project owner's strategic organizational objectives; satisfaction of users' needs and satisfaction of stakeholders' needs where they relate to the product.
- Project success versus project management success: Project success is measured against the overall objectives of the project while project management success is measured mostly against cost, time and quality (so called performance).Delivering project success is necessarily more difficult than delivering project management success since it involves second order control.

### 2.2.10 Success Factors in a Construction Projects

Increasing uncertainties in technology, budgets and development processes create a dynamic construction industry. Building projects are now much more complex and difficult and the building project team faces unmatched changes. The study of project success/failure and Critical success factors is a means of understanding and thereby improving the effectiveness of construction projects.

Several success factors for the construction process are as follows:

- ***Clarity/ Definition of project objective***
  - To state clearly the expected end result, with consultation with the related parties. Although each party might have different specific goals in mind for the project, they must spell out their goals,

- To state the communicated and defined goal to all parties,
- To state the clarified time and cost objectives.

- ***Scope of project***
  - To state the general direction and define the client's requirement.
  - To present a clear design brief with minimal subsequent changes. A brief must be exact and owned by the client at the highest (strategic) level within the client and project organizations.

- ***Project manager***

The Project Manager is the key person in the project. They must demonstrate multi-dimensional abilities including interpersonal, technical and administrative skills.

The most important element is that the project manager must clearly understand their role as project leader, clearly defining their extent of involvement, and the authority and control they exercise over personnel. Among the main elements are:

- Personality – the project manager must have a personality which encourages respect from team players, associates and peers.
- Leadership – the project manager should have leadership skills and be able to apply competent managerial skills. The project manager should have the ability to persuade other members of the group to their view, and be able to resolve conflict between parties.
- Organizing – the project manager should be responsible for organizing, selecting and defining the responsibilities of the project team.
- Coordinating – the project manager should identify interfaces between the activities of the functional departments, subcontractors, and other project contributors.
- Controlling – the project manager should be responsible for monitoring progress, identifying problems, communicating the status of interfaces to contributors, and initiating and co-coordinating corrective action.

- Motivating – the project manager should motivate the project team to perform their duties, and also convince the project team to co-operate with each other.
- Technical knowledge and experience – the project manager must possess good technical knowledge and experience, since most of the project is highly technical (Arti J. Jari, 2013).

- ***Project Team Commitment***

All participants must understand and be dedicated and strongly committed to achieve, maintain and fulfill project goals.

All participants must be committed to the concept of project planning and control and must be able to put the concept into practice. They must understand the project management process, its purpose and values, and be committed to following the steps and necessary procedures.

- ***Capability and cooperation***

All participants must possess adequate capabilities, including skills and experience.

All participants must retain appropriate interpersonal skills.

All participants must maintain a good working relationship between the client, the project team members and stakeholders.

All participants must sustain a healthy work attitude (Arti J. Jari, 2013).

- ***Planning***

The plan, or schedule, should be prepared as early as possible.

The plan should be prepared with as much detail as possible, including during the design process and throughout its phases. The detail required includes individual actions for project implementation, the party responsible for each action, and the technical standard required.

The plan should be realistic; it should identify the appropriate workload for the project team.

The plan must be updated regularly in order to keep pace with the project's development.

The team should be prepared to re-plan the job schedule to accommodate frequent changes on dynamic projects.

The team should incorporate detailed planning guidelines for termination.

- ***Control***

Schedule control – the project's managers and supervisors should jointly agree on intermediate milestones and build the detailed schedule around these. Successful project teams mark the achievement of milestones formally (for example by celebrating) in order to break the monotony of a long schedule into easily managed portions.

Costs control – focus on tracking the money spent. This requires detailed actual costs, and one of the best monitoring aids is a plot of plan versus actual costs on a cash-flow curve, for example, an earned – value analysis system.

Quality control – focus on ensuring the project reaches the agreed and designed level of quality. It must be closely examined during the entire process.

Methods of control include regular meetings and day-to-day reports etc.

- ***Appropriate size of work package and environment***

Divide the project tasks into appropriate sizes and identify the relevant parities responsible for each task.

Maintain the appropriate level of staff for the amount of work that needs to be done.

Consider the natural environment e.g. weather.

Consider sustainability, e.g. supply of materials.

Consider the political environment, e.g. the legal requirements of the regulatory authorities.

- ***Communication and information management***

Initiate and maintain adequate communication channels among the project team.

Ensure there is some way to manage the flow of information. The suggested methods of transferring information should include drawings, manuals, meetings and letters.

- ***Top management support and Health and safety***

Provide the necessary resources, authority and power for performing the project. Ensure legislative health and safety requirements are considered (Arti J. Jari, 2013)

### 2.2.11 General Advantages of a critical success factors Approach

Critical success factors can reduce organizational uncertainty. Developing and communicating a set of Critical success factors can reduce the dependence on the apparent aims of the organization. Critical success factors reflect the implied, collective drivers of key managers and as a result are a more dependable and independent articulation of the organization's key performance areas.

Critical success factors are more dependable than goals as a guiding force for the organization. An organization can set good goals that, in theory, will move the organization toward its mission. However, if the goals are poorly articulated or developed, this is not guaranteed. Critical success factors are reflective of what good managers do well to move the organization toward its mission, regardless of the quality of the goals that have been set.

Critical success factors are more likely to reflect the current operating environment of the organization. Goal setting tends to be a yearly activity that is seldom revisited until performance measurement. Used properly, Critical success factors are likely to be more dynamic and to reflect current operating conditions because of the many sources of Critical success factors.

Critical success factors provide a key risk-management perspective for the organization to consider. The risk perspective of executive-level managers is built into Critical success factors, so their 'radar screen' is exposed to the organization as a whole. Critical success factors can be valuable for course correction. When Critical success factors are made explicit, managers often realize that their perception of what is important to the organization may not match reality or they may realize that they don't fully understand the current operational climate. Thus, they can use Critical success factors to realign their operating activities.

A unique strength of the CSF method is that it takes into account the changing environment with which organizations and managers must deal. Also, CSF is especially suitable for top management and for the development of organization; the method produces an agreement among top mangers about what is important to measure in order to gauge the organizations success (Arti J. Jari, 2013).

## *2.3 FACTORS AFFECTING PERFORMANCE OF PROJECTS IN OTHER COUNTRIES*

In addition to revising different Literatures on factors affecting performance of Contractors, it is also important to revise researches conducted in different parts of the world and identify their findings. This will be useful to strengthen this research by giving more information in what is happening in the developed and developing countries. Hence, the following researches conducted in some countries are briefly discussed below:

### 2.3.1 Kenya

Based on a study conducted in Kenya, the majority of road construction projects in Kenya do not get completed within the initially set targets of time. Project delays frustrate the process of development, have an immeasurable cost implication to the society, and also lead to loss of reputation of the parties involved in the projects' execution. Project delays are a common problem internationally in the construction industry in modern times. Investigating the reasons for delay has become an important contribution to improved construction industry performance. Over seventy percent of projects initiated in Kenya are likely to escalate in time with a magnitude of over fifty percent. The study conducted in Kenya used purposive sampling technique and survey design. Data was collected using questionnaires which were distributed to consultants and contractors. The data was analyzed using the Relative Importance Index and Spearman's rank correlation.

The top four causes of project delays were observed to be payment by client, slow decision making and bureaucracy in client organization, inadequate planning and scheduling, and rain. It is recommended that clients should improve their financial management systems so that they are able to pay contractors in a timely manner. Bureaucracy and red tape should be reduced in client organizations in order to speed up the slow decision making process. Efficient management of the construction process will also lead to a reduction in incidences of claims. Contractors should prepare adequate plans and schedules which can also be used to minimize the effects of rain (Seboru, 2015).

### 2.3.2 Niger state

Construction projects in Niger state suffer from many problems and complicated issues in performance such as cost, time and quality. A study identified and evaluated the main factors affecting the performance of construction projects in Niger state. With the objectives of evaluating the most significant key performance indicators of construction projects and formulating recommendations to improve performance of construction projects, factors affecting the performance of construction projects were identified from a literature search and subjected to the views and opinions of respondents using a structured questionnaire.

The analyzed data's indicated that the most important factors agreed by the owners, consultants, and contractors as the main factors affecting the performance of construction projects in Niger State were: availability of personnel with a high experience and qualifications, quality of equipment and raw materials in project, conformance to specification, planned time for project construction, availability of resources as planned through project duration, average delay in payment from owner to contractor and information coordination between client and project parties. It was recommended that client should facilitate payment to contractors. All professional should participate in sensitive and vital decision-making. Continuous coordination and relationship between project participants are required for solving problems and developing project performance (Ruth, 2014).

### 2.3.3 Sudan

The success of a construction project depends on its performance, which is measured based on timely completion, within the budget, required quality standard and customer satisfaction. A study conducted in Sudan construction industry shows that Sudan is suffering from several problems and challenges such as poor performance of construction projects. This study identified those factors that enhance performance of the projects, as well as the factors that lead to the delay of projects in Sudan. Structured questionnaires were distributed randomly, completed and returned.

The analyzed data revealed that the most important factors influencing project performance were project team leader experience, planning effort, adequacy of design and specification, cost progress monitoring and leadership skill of leader (Abdelnaser Omran, 2012).

### 2.3.4 Gaza Strip

In a study conducted on Gaza Strip, construction projects located in the Gaza Strip, Palestine suffer from many problems and complex issues. With the objective of identifying factors affecting the performance of local construction projects; and eliciting perceptions of their relative importance, comprehensive literature review was deployed to generate a set of factors believed to affect project performance. Questionnaires were distributed to 3 key groups of project participants; namely owners, consultants and contractors.

The survey findings indicate that all 3 groups agree that the most important factors affecting project performance are: delays because of borders/roads closure leading to materials shortage; unavailability of resources; low level of project leadership skills; escalation of material prices; unavailability of highly experienced and qualified personnel; and poor quality of available equipment and raw materials. Based on these findings, the paper recommended that: 1) project owners must work collaboratively with contractors and facilitate regular payments in order to overcome delays, disputes and claims; 2) project participants should actively have their input in the process of decision- making; and 3) continuous coordination and relationship between project participants are required through the project life cycle in order to solve problems and develop project performance (Adnan Enshassi, 2009).

### 2.3.5 Malaysia

According to a study conducted in Malaysia, Project effectiveness measures are normally used by most researchers and practitioners to judge project performance and project success. The paper provides an empirical analysis of measures of success in terms of effectiveness performance in the development of construction projects in Malaysia. The survey was conducted in Malaysia among four project stakeholders: the Government, private clients, consultants, and contractors. On the questionnaire, lists of effectiveness of success measures were identified for the respondents to identify their level of success criticality to the Malaysian construction projects. The data were analyzed by means of statistical analysis.

The first finding revealed that the level of success criticality with regards to project efficiency performance in the development of construction projects in Malaysia is according to the specific requirements and priorities of different project stakeholders. The second finding shows that

effectiveness measures are related to the project 'results' achieved in the development of construction project. These are represented by the five principal factors namely: Learning and Exploitation; Client Satisfaction; Stakeholder Objectives; Operational Assurance and User Satisfaction. It is anticipated that the findings reported in the paper could be important for future strategies and guidelines for the development of projects in Malaysia (Takim, 2008).

### 2.3.6 South Korea

In Korea, Corporate management performance evaluation currently focuses on financial aspects; however, it is necessary to identify and manage elements that contribute to increased economic values in the long run. When it comes to construction firms, most previous research did not cover weighting and estimation approaches for non-financial elements that ultimately influence financial status. With the objective to develop a management performance evaluation model for Korean construction firms, the model included financial factors and non-financial factors. The research investigated actual data from Korean construction firms and classified their characteristics. This study is performed in two steps. First, the study derives KPIs for performance measurement techniques and weights the KPIs. And then, it applies the performance data of construction firms to the technique.

The findings of the study show that Korean construction firms consider customers to be the foremost priority, converse to previous research which argued that the internal business process was the top priority. The performance measurement results can be fed back into strategies and plans to shed light on issues, reflect on management plans for subsequent years and modify mid to long-term strategies. Therefore, the developed model can help decision-makers effectively revise their management plans (Donghoon Lee, 2013).

From the studies conducted above, the major factors affecting the performance of contractors include:, slow decision making and bureaucracy in client organization, inadequate planning and scheduling, rain, availability of personnel with a high experience and qualifications, quality of equipment and raw materials in project, conformance to specification, planned time for project construction, availability of resources as planned through project duration, average delay in payment from owner to contractor, information coordination between client and project parties, team leader experience, planning effort, adequacy of design and specification, cost progress monitoring, delays because of borders/roads closure leading to materials shortage, unavailability

of resources, low level of project leadership skills, escalation of material prices, poor quality of available equipment and raw materials, learning and exploitation, client satisfaction, stakeholder objectives, operational assurance and user satisfaction.

The above examples demonstrate that there are large amount of factors which affect the performance of contractors.

## *2.4 PERFORMANCE ASSESSMENT OF CONTRACTORS IN ERA*

### 2.4.1 History of Construction in Ethiopia

Ethiopia has a rich history of magnificent construction activities. The obelisks of Axum, the rock-hewn churches of Lalibela and the castles of Gondar are a few examples of this expertise.

With the introduction of modern civilization, particularly during the reign of Emperor Menelik, there have been some significant developments in this regard. The Addis-Djibouti railway line is one example where such a venture has been successfully carried out. During the Italian occupation of the 1930's there were some construction activities, particularly in the development of long trunk roads. After the Italian occupation and before the 1960's, expatriate contractors generally dominated most of the medium and small civil and building projects.

The experiences, as well as the financial benefits were almost exclusively in the hands of foreigners. Eventually local construction companies owned by Ethiopian professionals developed. It was however a long time before such companies were able to be accepted by international financers for international competitive bidding (ICB). Following the nationalization of many private construction companies plus the lack of international financing for the construction sector following the revolution of 1974, there was a significant decrease in the number of major civil engineering projects in the country.

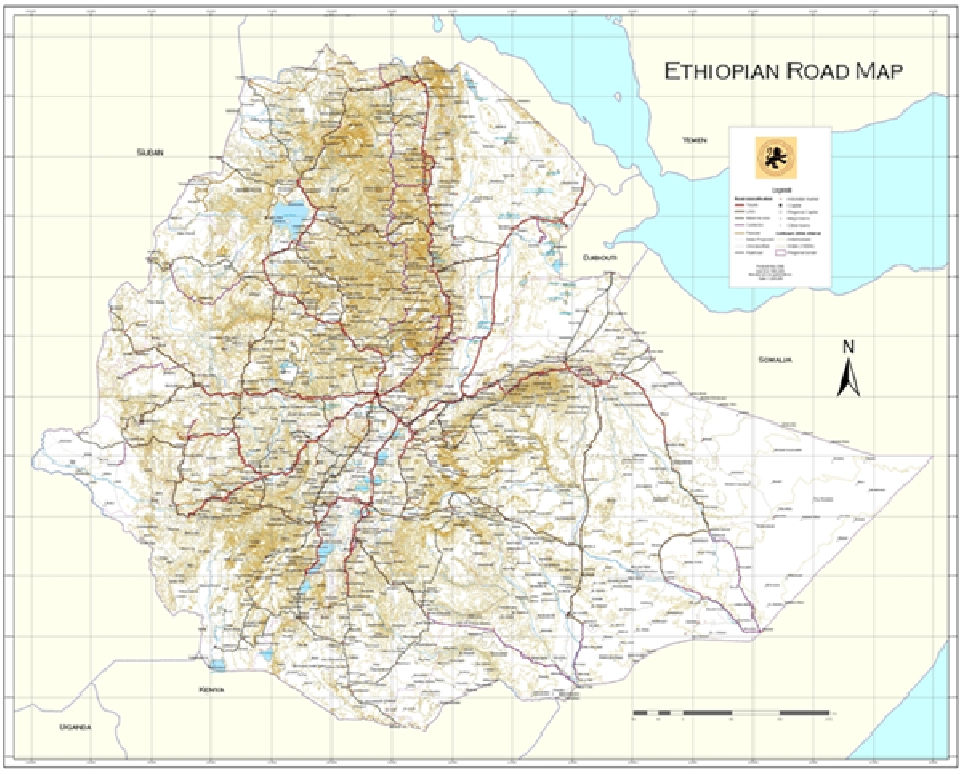
After the change of government in 1991 however, a steady increase in projects was observed in the civil construction sector. Not only was there steady growth in the number of engineering projects financed locally, but the contribution of foreign financing agencies as well as the participation of International contractors as well as consultants in major civil engineering projects also increased (Kahassay, 2003).

### 2.4.2 Ethiopian Roads Authority

The Ethiopian Roads Authority /ERA/ is a legally autonomous organization established on January 26, 1951. Ever since its establishment, the Authority has gone through a series of structural changes, the most recent one being in July 2011 by the Council of Ministers Regulation No. 247/2011. This regulation agrees with the split of the operational and regulatory wings as two independent entities, leaving ERA to focus on Road Network Development and Asset Management rather than construction and maintenance of same.

Hence, the main objectives of ERA, as stated in the aforementioned regulation, are to develop and administer roads, create conducive conditions for the coordinated development of roads network, and ensure the maintenance of standards in road construction.

Figure.2.1. Ethiopian Road Map




In the context of Ethiopia's geography, pattern of settlement and economic activity, transport plays a vital role in facilitating economic development. In particular, it is road transport that

provides the means for the movement of people, utilization of land and natural resources, improved agricultural production and marketing, access to social services, and opportunities for sustainable growth.

Recognizing the importance of the road transport in supporting social and economic growth and its role as a catalyst to meet poverty reduction targets, the Government of Ethiopia has placed increased emphasis on improvement of the quality and size of road infrastructure in the country. To address constraints in the road sector, mainly low road coverage and poor condition of the road network the Government formulated the Road Sector Development Program (RSDP) in 1997.

The RSDP has been implemented over a period of fifteen years and in four separate phases, as follows:

- RSDP I - Period from July 1997 to June 2002 (5 year plan)
- RSDP II - Period July 2002 to June 2007 (5 year plan)
- RSDP III - Period July 2007 to June 2010 (3 year plan)
- RSDP IV - Period July 2010 to June 2015 (5 year plan)

Over fifteen years of RSDP physical works consisting of rehabilitation and upgrading of trunk and link, construction of new link main access roads, construction of rural roads and community roads and maintenance of federal and regional road has been carried out by ERA, RRAs, wereda road desks, the community and municipalities. Also over fifteen years of RSDP series of policy and institutional reforms have been implemented in the sector. Government of Ethiopia has been major financer of RSDP followed by the Road Fund Office. Donors have supported RSDP in the past fifteen years including the World Bank, European Union, ADB, NDF, BADEA, OFID, the Governments of Japan, Germany, U.K. and Ireland. The Saudi Fund for Development, the Kuwait Fund and the Government of China has also joined the financing partnership since RSDP II. The recent partner which joined this effort is Abu Dhabi Fund.

An assessment of contribution of finance to the implementation of the RSDP shows that 75.4% came from internal sources (the Government, the Road Fund and the Community). The remaining 24.6% has been pooled from the international community. Specifically, the share of

the Government of Ethiopia is the highest (63.4%), followed by Road Fund (10.3%), the IDA (9.2%) and EU (6.2%). The overall disbursement over 15 years of RSDP is about Birr 108,462.2 million (USD 6380.3 million).

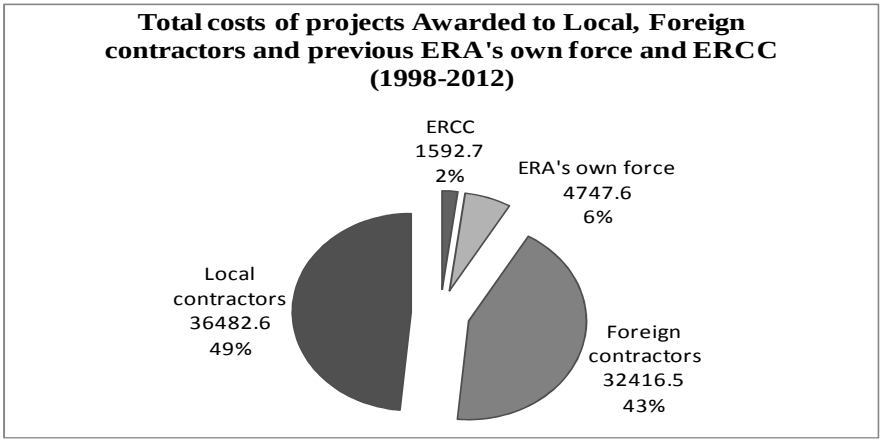
Over the fifteen years of RSDP, physical works have been undertaken on a total of 81363km of roads excluding routine maintenance work and community roads. The total budget for the planned works during this period amounted to ETB 107.8 billion (USD 6.4 billion). The total amount disbursed in the same period, is 101% of the planned target.

When it comes to capacity building, the impact of the program in building the capacity of the domestic construction industry is encouraging. Specifically, participation of the local contracting industry has increased, in terms of both the value and number of projects, over the last fifteen years of the RSDP. Some Local contractors are now taking relatively bigger contracts.

Participation of local consultants has been particularly encouraging. In terms of contract value local consultants have received around 55% of consultancy services during the RSDP.

Of the 887 contracts (both construction and consultancy) awarded over the last fifteen years of the program, some 643 contracts were awarded to local companies. The majority of these contracts, 63%, were for consultancy services, with 37% for road construction works. The value of civil works contracts awarded to local firms excluding ERCC and the previous ERA Own force was 36.5 billion to June 2012, whilst that for consultancy services amounted to some 2.3 billion.

Figure.2.2. Total Cost of Projects Awarded to Local, Foreign contractors and ERA's own force and ERCC (1998-2012)



The fifteen years of the RSDP performance has brought significant improvements in the restoration and expansion of Ethiopia's road network. Physical achievements have been matched by significant improvements in the condition of the network, strengthening of the management capacity of the road agencies and delivery on policy reform.

A total of 71,145 km of major physical road works excluding routine maintenance was carried out of which 23,078 km was on federal roads, 48,066, km was on regional roads construction and maintenance and 10,219 km was on URRAP roads. Over all physical accomplishment against plan including routine maintenance was 104%. Total disbursement was about ETB 108.5 billion and this disbursement was 101% of the plan.

Specifically 2,482 km of rehabilitation and 3,588 km of upgrading of trunk roads were carried out under the program. Upgrading and construction of link roads was on 3030 km and 4379 km respectively. Heavy maintenance on 9,600 km of federal road was also carried out (ERA, 2013).

### 2.4.3 Performance Evaluation of Contractors under Government Financed Tenders.

In works contracts of government financed projects, one of the major qualification criteria is performance assessment of bidders on ongoing projects. For bidders having ongoing projects with ERA, the performance assessment will be carried out following the indicated procedure (formula).If bidders do not have projects with ERA, the performance assessment shall be carried out following qualitative assessment of bidder's performance based on written feedback from their employers. The performance assessment is carried out every calendar month. Under each evaluation, the performance of the bidder in the immediate previous month (from the date/month of deadline for submission of the tender in reference) is used for evaluation.

**Performance Evaluation Formula for Local contractors**

The total contract duration is divided into three equal periods in such a way that:

- At the end of the first one third periods, the minimum expected progress is 9%.
- At the end of the second one third periods, the minimum expected progress is 38%.
- At the end of the last one third period or at the end of the contract period, the minimum expected progress is 70% and

- Beyond contract period but only up to a period of one fourth of the contract period, the project is expected to be completed 100%.
- Contractors, who fail to complete projects after elapse of one fourth period of the contract duration, will be disqualified.

**Performance Evaluation Formula for Foreign Contractors**

The total contract duration is divided into three equal periods in such a way that:

- At the end of the first one third periods, the minimum expected progress is 11%. At the end of the second one third periods, the minimum expected progress is 42%
- At the end of the last one third period or at the end of the contract period, the minimum expected progress is 80% and
- Beyond contract period but only up to a period of one ninth of the contract period, the project is expected to be completed 100%.
- Contractors, who fail to complete projects after elapse of one ninth period of the contract duration, will be disqualified.

**Expected Performance for Three or More Projects**

It is clear that as the number of projects that a given contractor can handle at a time increases, it does have an impact on the technical and managerial efficiency of the contractor unless and otherwise the contractor take some positive measures to reduce the negative impact resulted from the increase in number of new projects. On the other hand, employers would take risks in giving more number of new projects to the contractor; in so doing contributes to the contractor's inefficiency. Hence, in order to manage the risk of inefficiency due to increase in number of projects, it is suggested to raise the expected performance of a given contractor by a certain percentage if he has three or more contracts at his hand. Hence the formula developed to determine the additional percentage of expected performance is:

$$Y = 2*(1.5)^{n-3} \quad \text{[2.1]}$$

Table 2.1: Percentage of expected performance caused by additional projects

| **No. Of Projects** | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | n |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percentage Increase** | 2 | 3 | 4.5 | 6.8 | 10.1 | 15.2 | 22.8 | 34.2 | | | $=2*(1.5)^{n-3}$ |

The above table indicates additional percentage of the expected performance due to additional projects. For example, if a bidder is required to have expected performance of 50% and has five projects at hand, his expected performance will be revised as 54.5% which is calculated as [50% + 4.5%].

### 2.4.4 Stabilizing Road Construction Cost

The Government of Ethiopia has adapted the following sixteen (16) projects aimed at stabilizing road construction cost. The projects have been implemented since 2010.

*Project 1: Increasing the number of Local contractors to 100 by 2014.*

The scale of road construction in the country has been increasing under successive road sector development programs.

The participation of state owned contractors including the new contracting enterprises emerging from restructuring of the road authorities is an essential part of the efforts to increase the role of domestic contractors in the road sector. State owned contractors have a crucial role to play in stabilizing the road sector market.

As of September 2012 number of Local contractors including small contractors reached 61. Progress in implementing this project is as plan and by 2014 the target will be fully achieved.

*Project 2: Increasing the number of local consultants to 50 by 2014*

Participation of local consultants in road sector development is increasing. ERA awards all studies of road projects financed by GOE to local consultants. Local consultants also participate in studies being conducted by international consultants as local associates. As of October 2012 the number of local consultants reached sixty, which is already more than the target.

*Project 3: Build the capacity of state owned contractors and consultants*

The scale of road construction in the country has been increasing under successive road sector development programs. The participation of state owned contractors including the new

contracting enterprises emerging from restructuring of the road authorities is an essential part of the efforts to increase the role of domestic contractors and consultants in the road sector. State owned contractors and consultants have a crucial role to play in stabilizing the road sector market. Strategies are drawn on to build the capacity of state owned contractors and consultants and assist them adjust to the private sector:

Capacity assessment of state owned contractors and consultants have just been completed by international consultants.

*Project 4: Increase the number of professionals in the road sector*

The number of local consultants in the road sector is low due to shortage of qualified professionals. Local contractors have been unable to complete physical works on road projects at agreed times and cost due to shortage of qualified professionals. To address the shortage of qualified professionals in the road sector the following action plan is adopted:

Provide long-term training 1500 professionals, particularly engineers from road agencies, contractors and consultants by 2014.

A total of 1053 professionals mainly engineers are currently attending MSC program in Construction Management, Structural Engineering, Hydraulics, High Way Engineering and Geo techniques in 5 local Universities. This shows 70% of the target is accomplished.

*Project 5: Train road technicians under government vocational training programs*

Building sufficient capacity in the road sector and addressing bottlenecks in project implementation requires a significant increase in the number of competent technicians joining the road construction industry. Road building technology is included in the vocational training curriculum of the country.

Training and testing of road technicians has been carried out by ERA's training centers in Labor Based Road Construction and Maintenance, Road Construction Surveying, Road Construction Material Quality Testing and others since 2010. A total of 34973 technicians have been trained and 5699 have been tested of whom72.6% pass the test.

*Project 6: Improve road technician skills on paved road construction and maintenance*

The quality of bituminous surface treatment on recently completed road projects has been poor. As part of implementing the strategies intensive, training on Double Bituminous Surface Treatment (DBST) has been given to 436 engineers, technicians and operators.

*Project 7: Establish an equipment testing, handling and utilization centre*

Alemgena Training Centre is the only centre in the country that provides training on construction equipment operation, handling and maintenance. The centre plays crucial role in supporting the road sector. Training programs should be revised in line with the national strategy on technology testing and application. The strategy requires persons being hired in the public and private sector, after being graduated from technical schools, colleges and universities, to be tested to ensure that they possess the requisite skills and competence. Alemgena training centre have experts and equipment to test personnel. Strategies to implement this national strategy include:

As part of implementing the strategy Alemgena Training Centre is being upgraded with equipment and the capacity of its trainers is being enhanced to make it centre of excellence.

*Project 8 and 9: Complete road projects on time and within budget and improve contract administration*

A delay in works projects leads to cost increases. Progress of civil works of road projects has been improving but further efficiency gains are possible. Local contractors should be encouraged to plan, perform and monitor civil works throughout the period of implementation of the road projects. As part of efforts to improve implementation of projects performance evaluation has been implemented. Accordingly performance of foreign and Local contractors has been evaluated. The evaluation showed that performance of foreign contractors is rated at 88% and Local contractors rated at 81%. Out of foreign contractors performance of eight contractors is rated as above 90% while the rest foreign contractors rated between 55% and 85%. Foreign contractors with poor performance are being closely monitored. Out of local contractor's performance of four contractors are rated as above 90%. Low performance is observed from some of the new contractors while other new contractors have improved their performance. Support is being given to new contractors with low performance.

In addition, projects with poor performance have been identified and being closely monitored.

*Project 10: Improve the Quality of Road Projects Design*

Problems resulting from inefficiencies in the detailed project designs should be minimized. Most design problems are occurring due to inadequate attention given to project design by consultants.

Lack of professional ethics is major reason for poor quality of road projects design. Consultant's awareness of professional ethics should be improved and code of ethics should be prepared. Strategies are prepared to address ethics and other problems related to project design. Through monitoring, consultants not adhering to the code and demonstrating insufficient skill and competence will be excluded from future design projects.

*Project 11: Promote bulk purchasing of construction materials and equipment*

The prices for construction inputs, such as steel, equipment, spare parts and other inputs, are continuously escalating, reflecting both global and local demand. All construction sectors are affected and demands on foreign exchange is high. Where possible efforts will be taken to produce inputs locally and/or inputs should be procured in bulk from foreign factories. Bitumen should be purchased by central institutions and made accessible, at competitive prices, to the whole industry. Vehicle and equipment purchases for projects should also be made in bulk where this is possible.

*Project 12: Local manufacture of intermediate equipment and tools*

Manufacture of intermediate equipment such as tractor-towed rollers, trailers, water- trucks and graders is straight-forward and well within the capability and skills of the country. This type of equipment will be used for the construction and maintenance of rural roads and application can be expanded for construction and maintenance of higher standards of roads.

*Project 13: Improve Construction Equipment Maintenance Centers*

The structure and working systems of the garages of the Ethiopian Road Construction Corporation (ERCC) including central garage will be reformed and the efficiency improved by:

The central garage and also Alemgena Garage of ERCC are being reformed. The reform will continue to other district garages. The reform effort is being assisted by the Ministry of Education.

*Project 14: Improve Right-of –Way Management*

To ensure that contractors are not delayed and that the progress of works is in accordance with the agreed contract the road authorities will work closely with government agencies, utility suppliers and local administrations to ensure that obstructions are cleared in good time from the right-of way (ROW).

A five year Right-of-way clearance Plan (ROWCP) is being implemented. The ROWCP includes not only ongoing construction projects but also future construction projects. In other words the plans enable ERA clear ROW before construction is tendered. ERA is working in coordination with Ethiopian Power Corporation and Ethio Telecom on the clearance of power and Telecom lines from ROW of road projects and with local administrations on the removal of individual houses, businesses and other properties.

*Project 15: Improve Institutional Capacity for research*

Research Directorate has been set up in ERA to promote and undertake research in the road sector.

*Project 16: Building Instructional Capacity of the Road Sector*

Implementation Capacity of road agencies has been very much enhanced in the past fifteen years of RSDP. Because of increasing number of road projects the capacity of road agencies need further enhancement. Business Process Reengineering (BPR) plays crucial role in further enhancing implementation capacity of road agencies. ERA has already implemented its BPR. Under ERA's BPR, construction contract implementation capacity has been significantly enhanced (ERA, 2013).

### 2.4.5 Involvement of Local contractors in the Construction Industry

In the context of Ethiopia, the growth of the construction industry has followed a similar pattern which was observed in today's developed world. Currently, construction is one of the sectors leading the way towards modernization and industrialization in Ethiopia. It's also known to be an engine driving technological transformation, innovation and overall development.

The construction industry development policy which was put in place by the government of Ethiopia aims at addressing the lack of co-ordination existing between the industry and other

programs in various sectors of the economy. Moreover, it intends to reduce the heavy dependence on foreign construction materials and inputs and address the shortage of qualified and experienced personnel at all levels.

Even though various reform measures have been introduced to various industries, the domestic construction industry is still facing problems that have not been dealt with sufficiently. The challenges and prospects of the construction industry in Ethiopia is related to the capacity of Local contractors and consultants, quality, utilization of appropriate construction technologies, and application of proper building standards. Addressing such challenges is equivalent to significantly contributing to the socio-economic development of the country.

Since the sector is fundamental to the nation's economic activity, it can put a direct impact on the growth or stagnation of the overall economy. The industry also plays a crucial role in increasing foreign exchange and reducing unemployment and poverty.

Upgrading the level of performance of the industry into one which is internationally competitive cannot be achieved without using appropriate technologies and practices. The creation of a strong construction industry should be supported by sectoral and macro-economic policies. The development of the construction industry requires stakeholders' commitment in making sustained efforts in familiarizing themselves with appropriate technologies. To meaningfully improve the competitiveness of the industry, strong technological development is needed.

The construction industry is faced with lack of skilled manpower. Adequate human resource is essential for the industry to realize national development goals and meet the needs in the area. The challenges of the construction industry will experience a larger demand as the economy expands and sees the intended growth pattern in the future. However, the production of manpower will be primarily the responsibility of the education sector.

The domestic construction industry in Ethiopia is still characterized by inadequate capital base, old and limited equipment availability and utilization, deficiencies in technical, managerial, financial and entrepreneurial skills, limited experience and participation of the private sectors in construction and consultation works, and insufficient and ineffective use of labor-based road construction and maintenance technology.

The construction industry in Ethiopia is a sector that opens the door for the growth of many additional industries as metal products, clay works, and cement and cement products. As such, the growth of these industries will surely follow the growth of the construction industry.

Generally, the construction industry is a sector that can stimulate a big number of micro companies which are widely labor-based. In view of this the industry policy of the country has given attention to the construction industry.

To create suitable environment for the growth of the construction industry, the commitment of stakeholders is essential to make continued efforts in familiarizing themselves with appropriate technologies for better result. (Girma, 2015)

### 2.4.6 Involvement of International contractors in ERA

The road sector development program in Ethiopia is attracting foreign companies particularly, Chinese contractors because of the vast opportunity and its future prospect in relation to market.

CGC Overseas (CGCOC) is among the companies that undertake road project in Ethiopia. Started working in Ethiopia in 2003 as a water well contractor, CGCOC awarded 11 road projects since 2006, of which 4 are already finalized.

According to CGCOC the priority given by the government to the sector, the growth of the country, peace and stability as well as cheap labor attracted them to Ethiopia.

The Ethiopian government has established many road development programs. International contractors forecast the opportunity relating to the continuing growth of the country's economy. There is high potential for contractors in the road construction sector.

In the past ten years, the Ethiopian government has allocated sufficient fund to improve its infrastructure under its road sector development program (RDSP). When foreign contractors involve in road construction in a country, it shows for other investors that the country is 'stable' and this motivate them to come and work in that country.

China Communication Construction Company (CCCC) is another Chinese company engaged in the construction of roads in Ethiopia. The company built the recently inaugurated Addis Ababa – Adama Expressway, the first toll road of the country. According to CCCC, the fast economic growth of the country and the 'vast' market motivate the company to operate in Ethiopia and

roads are important for a country's development and prioritizing road development should be priority because 'Through the road; all the cargo, all transport becomes more fast and smooth.'

The road sector development program is one of the priority areas of the government in its efforts to improve the road network of the country. Knowing that expansion of the road network was necessary to meet development goals, the government has formulated the 10-year Road Sector Development Program (RSDP 1997–2007), a two-phased integrated package of investments, reforms, and institutional reorganization. The program was later extended to include a third and a fourth phase. Now the nation is implementing the fourth RSDP. Since the beginning of the program a number of roads were constructed by local and foreign companies.

Considering the importance of involvement of foreign companies in the road sector in terms of finance and technology, the government has been encouraging foreign companies to engage in the area. As a result, 106 of the total projects are awarded to foreign contractors, of which 77 projects with 58 billion birr are given to Chinese contractors. The remaining awarded to contractors from Yemen, Turkey, India, Egypt and Spain.

As the country's road network is still small and needs more work, more foreign companies, especially Chinese are attracted to it. Over 20 Chinese contractors are operating in the country. The contractors are engaged in construction of new roads, upgrading and maintenance. Accordingly, it is good opportunities for Local contractors to learn from foreign companies thereby improve their capability and competitiveness (FBC, 2014).

## *2.5 SUMMARY*

Performance measures are approaches to determine if a process has obtained the desired result. However, the diversity of the construction process makes it difficult to apply just a simple definition. In reality, performance is relative and accessed via comparison to observed best practice. This requires appropriate and current data in an objective (i.e. numeric) format across a wide range of construction types, locations, time and regulatory environments that makes the task difficult if not impossible to complete.

The construction industry has long been criticized for apparent under performance. No single framework or approach fits all situations – all have their advantages and disadvantages – and

therefore 'it is an important task to develop a more comprehensive performance measurement framework in construction in the future'.

Construction is one of the sectors leading the way towards modernization and industrialization in Ethiopia. Performance measurement is one of the basic and major steps for successful completion of a project. In the Literature review it is stated that ERA performs Performance Evaluation to award for good performing contractors and to penalize for the poor performance. ERA sets history of non-performing contracts and poor performance as one of the criteria to qualify for the project. In addition to that contractor's performance is evaluated based on the ERA's contractor's performance assessment framework and rating which is set by ERA Board.

The means of evaluation of the performance of the contractors for their work with ERA is based on the progress of the work in monitory terms of the previous month on the date of opening of the qualification documents by comparing with the client expected performance of each project on to duration.

The performance evaluation formula for Local contractors and International contractors at the end of the contract period shows that the minimum expected progress is 70% and 80% respectively. These shows that time delay is acceptable with ERA as a means of performance improvement technique.

In addition to this as stated in the Literature review to stabilize Road Construction Cost the Government has adopted 16 projects aimed at stabilizing road construction cost like: Increasing the number of Local contractors, build the capacity of state owned contractors and consultants, Increase the number of professionals in the road sector, train road technicians under government vocational training programs, complete road projects on time and within budget and improve contract administration, promote bulk purchasing of construction materials and equipment, local manufacture of intermediate equipment and tools and others.

As summarized from the researchers conducted in some countries, various factors affect the performance of contractors in different countries. For instance in areas where there is war, the main challenge could be factors related to political consideration.

It is clear from the Literature review that there is a performance problem from both Local and International contractors in ERA. Besides the evaluation which ERA carries out, it is found

important to investigate and identify the critical factors which are affecting the Performance of these groups of contractors from themselves.

Therefore as mentioned in the objective, the thesis looks beyond ERA's performance evaluation and identify critical factors as Key Performance Indicators (KPIs) such as time, cost, quality, client satisfaction; productivity, safety, culture and environment in order to enable measurement of current organizational project performance and to achieve significant performance improvements of future projects from both Local and International contractors.

The two groups of the contractors are expected to identify the critical factors which are challenging them on the performance of their projects.

In identifying factors affecting performance of Local and International contractors in ERA, different factors which have impact on the performance have been identified from the Literature review. Some of the identified factors are common to both groups and some are applicable for International contractors only as commercial and political considerations. The detail of identified factors is indicated in Chapter 4.

# 3. RESEARCH METHODOLOGY

## *3.1 RESEARCH TYPE*

The thesis tries to explore the major factors affecting the performance of Local and International contractors in road projects administered by ERA and it is more of applied and exploratory type. It was initiated from practical problems and finds whether there is a performance problem and correlates the problem with the rate of successful completion of road projects by the contractors.

## *3.2 THE STUDY APPROACH*

The approach adapted for this thesis was to undertake research through survey of questionnaire having descriptive output.

## *3.3 THE RESEARCH INSTRUMENT*

The research instrument used in this thesis is a semi-structured questionnaire.

## *3.4 THE RSEARCH POPULATION AND SAMPLING*

As it is difficult to carry out a survey to the whole population of study, simple random sampling was carried out so that each member of the population has an equal chance of being selected. However due consideration was given while selecting the data sources since the collected data determines the validity of the research outcome. Accordingly, representatives of Local and International contractors were selected as source of data given that they are the main provider and recipient of the performance process. In these thesis the client ERA, consultants and financers are excluded from the survey and attention is given to Local and International contractors only.

## *3.5 THE RESEARCH SCOPE AND LIMITATION*

The target populations of this thesis are the Local and International contractors involved in road projects administered by ERA in RSDP IV. Even if each group of contractors suffers from various factors of performance in road projects, the type, degree and cause of the problems are different.

In spite of the fact that problems are hindering the performance of the contractors in road projects, the effect of the identified factors both on the contractors and the projects have not been properly studied.

## *3.6 WRITING THE RESEARCH*

This thesis document is classified in to five major parts:

Chapter 1: Introduction

Chapter 2: Literature review

Chapter 3: Research methodology

Chapter 4: Analysis and discussions

Chapter 5: Conclusions and recommendations

# 4. ANALYSIS AND DISCUSSION

## *4.1 INTRODUCTION*

This thesis presents a Comparative Analysis on Factors Affecting Performance of Local and International contractors in Road Projects administered by Ethiopian Roads Authority. From literature review and past studies, a general image of the environment in performance measurement is discussed. In addition to that, theoretical background of performance measurement has been assessed to address the potential factors that influence performance of road contractors.

Based on this a questionnaire was developed to collect data from professionals who have sufficient experience on possible challenges encountered by Local and International contractors on road projects administered by Ethiopian Roads Authority.

In these chapter explanations to the issues related to distribution of the questionnaire, collection of responses, subsequent analysis and discussion of the data acquired through the responses from professionals are presented.

The principal purpose is to rank the identified factors of performance from all the groups and find out the major factors that are required to be given due attention in the performance measurement of both Local and International Contracts to substantially minimize the poor performance in road projects in Ethiopia.

## *4.2 QUESTIONNAIRE DESIGN AND FACTORS*

The following 37 factors for both Local and International contractors and 15 factors for International contractors only were identified from the Literature review and found to be relevant to the underlying requirements of this thesis. These first thirty seven factors were grouped into ten groups based on literature review. The factors, which are considered in the questionnaire, are summarized and collected according to previous studies and other factors are included as required by theses thesis. The lists of the factors are identified in Table 4.1 and 4.2 below.

Table 4.1: Identified factors affecting the performance of both Local and International contractors in road construction projects.

| I/No | Identified Factors Affecting Performance of Road Construction Projects |
|---|---|
| A | **Cost Factors** |
| 1 | Liquidity of the organization |
| 2 | Cash flow of project |
| 3 | Cost of material and equipment |
| 4 | Escalation of material prices |
| 5 | Differentiation of currency prices |
| B | **Time Factors** |
| 6 | Poor estimation of the project time |
| 7 | Average delay due to Right- of- way problem |
| 8 | Percentage of orders delivered late |
| 9 | Average delay in claim approval |
| 10 | Average delay in regular payments |
| 11 | Unavailability of resources |
| 12 | Average delay because of materials shortage |
| C | **Quality Factors** |
| 13 | Conformance to specification |
| 14 | Availability of personals with high experience and qualification |
| 15 | Quality of raw materials |
| 16 | Quality of equipments in project |
| D | **Productivity Factor** |
| 17 | Number of new projects / year |
| 18 | Management-labor relationship |
| 19 | Sequencing of work according to schedule |

| I/No | Identified Factors Affecting Performance of Road Construction Projects |
|---|---|
| E | **Client related Factors** |
| 20 | Information coordination between owner and project parties |
| 21 | Leadership skills of project manager |
| 22 | Number of disputes between owner and project parties |
| 23 | Number of rework incidents |
| F | **Regular and Community related Factors** |
| 24 | Cost of compliance to regulators requirements |
| 25 | Number of non-compliance events |
| G | **People Factor** |
| 26 | Employee attitudes in project |
| 27 | Recruitment of employees and competence development |
| 28 | Motivation of employees |
| 29 | Belonging to work |
| H | **Health and Safety Factors** |
| 30 | Application of health and safety factors in organization |
| 31 | Project location is safe to reach |
| 32 | Reportable accidents rate in project |
| I | **Innovation and Learning related Factors** |
| 33 | Learning from own experience and past history |
| 34 | Learning from best practice and experience of others |
| 35 | Training the human recourse in the skills demanded by the project |
| J | **Environmental Factors** |
| 36 | Wastes around the site |
| 37 | Climate condition |

Table 4.2: Identified factors affecting the performance of International contractors in road construction projects.

| I/No | Identified Factors Affecting Performance of Road Construction Projects |
|---|---|
| 1 | Business case / Economic feasibility |
| 2 | Implementation of new tax |
| 3 | The cost, availability and utility of currency |
| 4 | Insurance |
| 5 | Legal entity establishment |
| 6 | National Employment |
| 7 | Political stability |
| 8 | Social stability |
| 9 | Cultural and religious issues |
| 10 | Language difficulties |
| 11 | Governing law |
| 12 | Dispute resolution and enforcement |
| 13 | Sub contractors and supply chain quality |
| 14 | Shipping and custom clearance |
| 15 | Securing visas |

A questionnaire survey has been conducted to gather the required information from professionals who are involved in the road construction sector in Ethiopia working on behalf of Local and International contractors towards answering the basic research question. The questionnaire was divided into the following four major sections.

**Section 1:**

This section consists of inquiries on general background information of the respondent and the organization in which the respondent is representing for.

**Section 2:**

It incorporates list of thirty seven identified factors for both Local and International contractors which have effect toward the project success criteria i.e. time, cost, quality, client satisfaction, productivity and others. For each factor the degree of impact has been asked. The degree of impact was categorized on a five scale: Very high, High, Moderate, Neutral, and None.

**Section 3:**

It incorporates list sixteen factors for International contractors which have effect toward the project success criteria i.e. time, cost, quality, client satisfaction, productivity and others. For each factor the degree of impact has been asked. The degree of impact was categorized on a five scale: Very high, High, Moderate, Neutral, and None.

**Section 4:**

This section incorporates six questions, which are aimed to acquire additional information that will indicate the direction on how to control the performance process toward fulfilling the project success in road projects administered by ERA. The respondents have been asked to answer each question by selecting from the choices.

**Section 5:**

This section incorporate four open ended questions, which are aimed to get information from what both groups of Contractors observe and suggest for better performance of projects based on the current situation.

The questionnaire is attached as annex-A.

### *4.3 DISTRIBUTION AND RESPONSE RATE*

Detailed questionnaires were designed and distributed for the identification of factors affecting performance of Local and International contractors in road projects administered by ERA. The questionnaires were distributed to the Local and International contractors. A total of 30 questionnaires were distributed as follows: 15 to professionals each working for Local contractors and 15 to professionals working for International contractors. Table 4.3 presents the samples and their distributions, including the response rate.

Table 4.3: Distribution and response of questionnaire

| Item | Description | Number distributed | Number of responses | % of number distributed | % of number of response |
|---|---|---|---|---|---|
| 1 | Local Contractors | 15 | **12** | 100% | **80%** |
| 2 | International Contractors | 15 | **10** | 100% | **67%** |
| | Total | 30 | **22** | 100% | **74%** |

From the 30 questionnaires distributed a total of 22 responses were received, consisting of 12 (80%) from the Local contractors and 10 (67%) from the International contractors. The overall response rate was 74% as shown in Table 3.3. The response rate from the International contractors (67%) was on the lower side. Assessment of experience of individual respondents shows that 82% of the total respondents have more than 5 years experience in road projects; out of this 40% have experience of more than 10 years.

### *4.4 DATA ANALYSIS APPROACH*

For each factors affecting performance of Local and International contractors respondents were requested to indicate the degree of impact. The degree of impact has been categorized into five scales. Before starting the analysis, weightings have been assigned to each of the categories as 5 for very high, 4 for high, 3 for moderate, 2 for neutral and 1 for none. Then the responses given by each of the respondents have been summarized and counted.

The analysis was aided by the use of Statistic Package for Social Science (SPSS) where the scores assigned to each factor by the respondents were entered and consequently the responses from the questionnaires were subjected to statistical analysis for further insight. The contribution of each of the factors to overall performance was examined and the ranking of the attributes in terms of their criticality as perceived by the respondents was done by use of Relative Importance Index (RII) which was computed using equation [4.1] and the results of the analysis are presented from Table 4.4 to Table 4.6.

$$RII = \frac{\Sigma W}{A \times N}, (0 \leq RII \leq 1) \text{ ---------- [Eq. 4.1]}$$

Where:

W – is the weight given to each factor by the respondents and ranges from 1 to 5, (where '5' is 'Very high' and '1' is 'Never')

A – is the highest weight (i.e. 5 in this case) and;

N – is the total number of respondents.

### *4.5 FACTORS AFFECTING PERFORMANCE OF BOTH GROUPS OF CONTRACTORS*

Analysis of the data has been made using the aforementioned statistical methods considering the identified factors affecting performance. The results of this part of study provide an indication of the relative importance index and rank of factors affecting the performance of Local and International contractors on road projects administered by ERA. Besides, results of each of the questions raised in Section 3 and Section 4 of the questionnaire have been dealt with.

The results of this part of study provide an indication of the relative importance index and rank of factors affecting the performance of contractors in road projects. Table 4.4 shows summary of the factors ranking according to each type of target group.

Table 4.4: The relative importance index (RII) and rank of factors affecting the performance of construction projects according to each Group.

| I/No | Factors | Local Contractors | | International Contractors | |
|---|---|---|---|---|---|
| | | RII | Rank | RII | Rank |
| A | **Cost Factors** | | | | |
| 1 | Liquidity of the organization | 0.90 | 2 | 0.60 | 12 |
| 2 | Cash flow of project | 0.90 | 2 | 0.65 | 7 |
| 3 | Cost of material and equipment | 0.75 | 12 | 0.55 | 19 |
| 4 | Escalation of material prices | 0.75 | 12 | 0.65 | 7 |
| 5 | Differentiation of currency prices | 0.80 | 7 | 0.45 | 30 |
| B | **Time Factors** | | | | |
| 6 | Poor estimation of the project time | 0.80 | 7 | 0.70 | 4 |
| 7 | Average delay due to Right- of- way problem | 0.95 | 1 | 0.95 | 1 |
| 8 | Percentage of orders delivered late | 0.65 | 21 | 0.65 | 7 |
| 9 | Average delay in claim approval | 0.85 | 5 | 0.70 | 4 |
| 10 | Average delay in regular payments | 0.60 | 25 | 0.50 | 25 |
| 11 | Unavailability of resources | 0.70 | 18 | 0.65 | 7 |
| 12 | Average delay because of materials shortage | 0.45 | 36 | 0.60 | 12 |
| C | **Quality Factors** | | | | |
| 13 | Conformance to specification | 0.55 | 32 | 0.50 | 25 |
| 14 | Availability of personals with high experience and qualification | 0.90 | 2 | 0.60 | 12 |
| 15 | Quality of raw materials | 0.70 | 18 | 0.65 | 7 |
| 16 | Quality of equipments in project | 0.70 | 18 | 0.50 | 25 |
| D | **Productivity Factor** | | | | |
| 17 | Number of new projects / year | 0.55 | 32 | 0.40 | 32 |
| 18 | Management-labor relationship | 0.65 | 21 | 0.75 | 3 |
| 19 | Sequencing of work according to schedule | 0.80 | 7 | 0.55 | 19 |

| I/No | Factors | Local Contractors | | International Contractors | |
|---|---|---|---|---|---|
| | | RII | Rank | RII | Rank |
| E | **Client related Factors** | | | | |
| 20 | Information coordination between owner and project parties | 0.60 | 25 | 0.60 | 12 |
| 21 | Leadership skills of project manager | 0.85 | 5 | 0.60 | 12 |
| 22 | Number of disputes between owner and project parties | 0.80 | 7 | 0.85 | 2 |
| 23 | Number of rework incidents | 0.50 | 35 | 0.40 | 32 |
| F | **Regular and Community related Factors** | | | | |
| 24 | Cost of compliance to regulators requirements | 0.55 | 32 | 0.30 | 36 |
| 25 | Number of non-compliance events | 0.40 | 37 | 0.40 | 32 |
| G | **People Factor** | | | | |
| 26 | Employee attitudes in project | 0.60 | 25 | 0.40 | 32 |
| 27 | Recruitment of employees and competence development | 0.80 | 7 | 0.70 | 5 |
| 28 | Motivation of employees | 0.60 | 25 | 0.60 | 12 |
| 29 | Belonging to work | 0.75 | 12 | 0.50 | 25 |
| H | **Health and Safety Factors** | | | | |
| 30 | Application of health and safety factors in organization | 0.60 | 25 | 0.60 | 12 |
| 31 | Project location is safe to reach | 0.60 | 25 | 0.45 | 30 |
| 32 | Reportable accidents rate in project | 0.75 | 12 | 0.50 | 25 |
| I | **Innovation and Learning related Factors** | | | | |
| 33 | Learning from own experience and past history | 0.75 | 12 | 0.55 | 19 |
| 34 | Learning from best practice and experience of others | 0.75 | 12 | 0.55 | 19 |
| 35 | Training the human recourse in the skills demanded by the project | 0.65 | 21 | 0.55 | 19 |
| J | **Environmental Factors** | | | | |
| 36 | Wastes around the site | 0.60 | 25 | 0.30 | 36 |
| 37 | Climate condition | 0.65 | 21 | 0.55 | 19 |

The most important factors agreed by both Local and International contractors as the main factors affecting the performance of road construction projects administered by ERA were: Right- of- way related issues, Cash flow, Average delay in claim approval, Number of dispute between owner and project parties, Planned time for construction, Availability of personnel with high experience and qualification. This can be explained and shown by Table 4.5.

Both the agreement and significant differences on identified major factors by the two groups of contractors is discussed in the discussion part of this chapter.

Table 4.5: The top significant factors affecting the performance of both Local and International contractors.

| No. | Factors | Local Contractors | | International Contractors | | Both Contractors | |
|---|---|---|---|---|---|---|---|
| | | RII | Rank | RII | Rank | RII | Rank |
| 1 | Average delay due to Right- of- way problem | 0.95 | **1** | 0.95 | **1** | 0.95 | **1** |
| 2 | Dispute between owner and project parties | 0.80 | **7** | 0.85 | **2** | 0.83 | **2** |
| 3 | Cash flow | 0.90 | **2** | 0.65 | **7** | 0.78 | **3** |
| 4 | Average delay in claim approval | 0.85 | **5** | 0.70 | **4** | 0.78 | **3** |
| 5 | Poor estimation of the project time | 0.80 | **7** | 0.70 | **4** | 0.75 | **5** |
| 6 | Personnel with high experience and qualification | 0.90 | **2** | 0.60 | **12** | 0.75 | **5** |
| 7 | Recruitment of employees | 0.80 | **7** | 0.70 | **5** | 0.75 | **5** |
| 8 | Liquidity of the organization | 0.90 | **2** | 0.60 | **12** | 0.75 | **5** |
| 9 | Leadership skill of the PM | 0.85 | **5** | 0.60 | **12** | 0.73 | **9** |
| 10 | Escalation of material price | 0.75 | **12** | 0.65 | **7** | 0.70 | **10** |

1. According to all response, average delay due to right-of-way problem has been the main factor affecting performance as it has the first rank among all factors with RII = 0.950. Right-of-way problem is a dominant challenge for road construction projects. Both Local and International contractors agree that right off way problem is a major cause that affect their performance. Contractors lose their time and money as their resources will be forced to work less efficiently or even be idle.

In most cases the main points related to these problems are preparing compensation, finding replacement houses or land, giving adequate time for the resident prior to leaving their houses and relocation of utility lines. The entire task requires the involvement, coordination and devotion of many administration offices and awareness of the public which finally makes the Right-of-way problem difficult.

Although, ERA in its five year Right-of-way clearance plan propose to clear right-of-way before construction is tendered, practically it is observed that the right- of- way problem exists and remains to be the main challenging part for contractors.

Right-of-way problem results in a number of costs on any project as price escalation due to extension of time, additional overhead cost on the contractor and on the overall progress of the works for it will no longer be in accordance with the agreed contract.

Since right-of-way problem is mainly related to the Client, ERA shall play the main role by working in coordination with local administrations on the removal of individual houses, businesses and other properties and with Ethiopian Power Corporation and Ethio Telecom on the clearance of power and Telecom lines from right-of-way of road projects.

2. Number of disputes between owner and project parties has been ranked in the second position with RII equal 0.825. Disputes between owner and project parties will affect on relationship between them and can affect the performance of project.

No construction method is perfect. Thus, parties entering into any construction contract may find it very beneficial to devote attention, early in the contracting process, to the express provision of some mechanism for resolving disputes. Out-of-court methods of dispute resolution have become increasingly popular.

The choice of non judicial mechanisms for the resolution of contract disputes is motivated, at least in part, by the desire to avoid ever-increasing costs and time involved in litigation.

3. Cash flow problem has been ranked in the third position with RII=0.775. Lack of control over cash flow has been a major contributing factor to the high rate of insolvencies in the construction industry and it is a subject that should be taken seriously by both Local and International contractors. Simply stated, contractors go out of business because they run out of money, not because they run out of work.

Cash flow problems can be caused by a number of factors, many of which are unrelated to job profits. Examples include:

- Poor advance payment utilization
- Payments made to suppliers or subcontractors before receiving cash payment from the related project
- Low unit rates fixed during tendering
- Cash purchases of fixed assets

- Time lags between billing and collection of receivables (slow payers)
- Cash used for outside investments
- Cash advances or loans to officers or employees
- Overstock of inventory

Some common deficiencies that drain a contractors' cash flow include:

- Not closing out completed projects
- Not having standard procedures to issue payment requisitions on a timely basis
- Assuming there is nothing a company can do to speed up collections and ignoring the aging of receivables

Cash flow problems can be controlled if they are identified and addressed early. If ignored, they can result in increased interest expense, increased investment of owners' capital, diminished credit ratings, inability to take advantage of new opportunities and ultimately, failure of the business (Gavin, 2010).

Construction companies operate differently from most businesses because no project is the same. Therefore, improving cash flow requires some different strategies. A lot will depend on the project manager’s ability to manage cash flow. Aside from having the right project management, a construction company should do everything in its power to increase the speed of receivables, which will improve cash flow.

4. Average delay in claim approval has been ranked in the fourth position with RII = 0.775. Delay in claim approval from owner to contractor will lead to delay of contractors' performance. If a claim is not settled on time it could lead to dispute and could even effect the project execution itself.

The purpose of claims by contractors is to seek additional money over and above the contract prices. For the Client, however, it means additional costs, which in the end may make the project commercially impossible. Such a differing interest in the execution of a project will inevitably lead to disputes. Considering the unavoidability of such problems, dispute resolution mechanisms are placed in many forms of contracts. Current dispute resolution mechanisms

stipulated in different forms of contract place the Engineer as the central element in the dispute resolution mechanism.

5. Poor estimation of the project time has been ranked in the fifth position with RII = 0.75. Estimation of the project time by ERA which is most of the time not practical is affecting the performance of contractors and projects are suffering from delay and dispute between the contractors and ERA.

The major victims of time delay are the client and the contractor. The client will not find the project to give its intended service at the original planned time and will bear additional cost, while the contractor will be subjected to additional over head cost for prolonged period.

Construction time estimation is an integral part of preparation of an engineer's estimate. Estimation of construction time is important from various aspects e.g. for project planning and scheduling, project cash flow forecasting and for efficient contract administration. In construction contracts provision of bonuses for contractors who finish works earlier or imposing penalty for those delaying the works could be provisioned if an objective method of calculation of project time is available.

6. Unavailability of personnel with high experience and qualification has been ranked in sixth position with RII = 0.75. This factor is important for contractors because availability of personals with high experience and qualification assist contractors to implement their projects with a successful and suitable performance.

The financial success of a construction enterprise depends almost entirely on the quality of its management. The construction industry is faced with lack of skilled manpower. Adequate human resource is essential for the industry to realize national development goals and meet the needs in the area. The challenges of the construction industry will experience a larger demand as the economy expands and sees the intended growth pattern in the future. A certain level of construction experience, expertise and training are required to manage a sustainable construction company.

7. Recruitment of employees and competence development has been ranked in seventh position with RII = 0.75. Recruitment and competence development between employees improve performance of project and the client will be more satisfied.

A competent workforce is the core of any successful company. Without employees that perform at a high level each day, a company will loosen and fail. The key to having competent employees is implementing an effective recruiting and training process. Successful recruiting techniques focus on identifying strong candidates, while successful training techniques consist of providing as much guidance as possible to new employees before letting them jump into their new positions.

Recruitment of employees and competence development has direct relationship with the unavailability of personnel with high experience and qualification. It is after having experienced and qualified personnel that the recruitment of employees can becomes possible.

8. Liquidity of the organization has been ranked in eighth position with RII = 0.75.

Liquidity is the term used to describe how easy it is to convert assets to cash. The most liquid asset, and what everything else is compared to, is cash. This is because it can always be used easily and immediately. The asset aspect of financial liquidity, which is financial liquidity of company's assets – is the ability to convert assets into cash in the shortest possible time, at the lowest possible costs and without losing their value. Appropriate resources of liquid elements of the assets, including cash, are the enterprise's protection against the loss of financial liquidity.

9. Leadership skill of the project Manager has been ranked ninth with RII = 0.725. The presence of competent Project Manager in a construction firm is basic to achieve the goals of a project.

While experience in engineering and construction is important, the critical skills needed to be a successful project manager (PM) are not technical. They are leadership and management skills that will help to lead and manage the project in such a manner that the project's objectives are achieved. Leadership is the process of influencing individuals or groups to accomplish an organizational goal or mission. Management is the process of planning, organizing, directing and controlling a project or activity.

10. Escalation of material price has been ranked in tenth position with RII = 0.70.

The unmatched escalation of material prices in the construction industry causes significant financial hardships for unprepared suppliers, subcontractors, contractors, and owners. It is certain that profits will be lost, relationships will be damaged, projects will be impacted, and

construction lawyers will be called upon to look for ways to soften or shift the impact of material escalation on their unprepared construction clients.

### *4.6 FACTORS AFFECTING PERFORMANCE OF INTERNATIONAL CONTRACTORS*

The results of this part of study provide an indication of the relative importance index and rank of factors affecting the performance of International contractors on road projects administered by ERA. Table 4.6, show summary of factors ranking according International contractors

Table 4.6: The relative importance index (RII) and rank of factors affecting the performance of International on road projects administered by ERA.

| No. | Factors | International Contractors | |
|---|---|---|---|
| | | RII | Rank |
| 1 | Implementation of new tax | 0.90 | **1** |
| 2 | Dispute resolution and enforcement | 0.90 | **1** |
| 3 | Business case / Economic feasibility | 0.85 | **3** |
| 4 | Governing law of contract | 0.85 | **3** |
| 5 | Importation, customs and visa issues | 0.85 | **3** |
| 6 | Political and Social stability | 0.80 | **6** |
| 7 | Sub contractors and supply chain quality | 0.80 | **7** |

As shown in Table 4.6 Implementation of new tax has been ranked in first place with RII = 0.9. The potential consequences of adverse taxation issues are so great that the issue deserves independent identification and professional analysis. Consideration of the local tax system and tax consequences in the home jurisdiction and the risk of the implementation of new taxes as a result of changes in law should always be considered by International contractors.

Dispute resolution and enforcement has been ranked in the second position with RII = 0.90.

International contractors may have an expectation with respect to the dispute resolution mechanism to be incorporated into the contract. While these issues are often open to negotiation, local customs do tend to have an impact. Since enforceability of judgments or arbitral awards can potentially create significant jurisdictional risks, consideration of the issue should be made prior to contracting.

Business case / Economic feasibility has been ranked in position third with RII = 0.85.

Before submitting a tender for any project in new country International contractors, in consultation with local professional assistance, should have a sufficiently detailed financial analysis with respect to the likely costs and required equity investment, revenues, margins and after- tax profits that may be achieved. This analysis should consider any legal or economic barriers to entry.

Governing law of a contract has been ranked in the fourth position with RII = 0.85.

The governing law of the contract will obviously need to be carefully chosen. This decision will be influenced by the nationality of the parties and the location of the project. It may also be affected by the decision of the funders. The parties should also consider the interaction between compulsory elements of the domestic law where a project is taking place and the governing law of the contract, and the possibility of conflict between them.

Importation, customs and visa issues has been ranked in the fifth position with RII = 0.85.

Failure to secure customs clearance for construction plants can create schedule risk and potentially costs pressure, in the event that plant has to be hired or procured locally. Risks or delays in securing visas for international professional staff and labor can result in significant time and potential cost consequences.

Political and Social stability has been ranked in the sixth position with RII = 0.80.

A major concern for an international project is whether the political and social situation in the host country will change in such way that the operating position will deteriorate. The occurrence of events may change the projections for profitability of a global business venture of a given investment. The political actions that may affect the business or construction operations may include governmental takeover of properties, with or without compensation, changes in import or export regulations, or even political revolution leading to other severe changes. Failure to analyze and fully understand these risk exposures may seriously affect one's objectives for profit, market share, and long-term relations.

Sub contractors and supply chain quality has been ranked in seventh position with RII = 0.80.

The domestic success of International contractors is often driven by strong relationships with quality subcontractors and suppliers. These relationships take time to develop and are the result of 'trial and error'. The associated risks are, selecting the wrong subcontractors or suppliers and being unable to find satisfactorily skilled subcontractors in the local jurisdiction.

### *4.7 PRACTICES CONCERNING MANAGEMENT OF PERFORMANCE PROCES*

The following questions address how to manage the performance process in order to increase the performance of the projects by both groups of contractors working in road projects in ERA. To get a wider perspective in recommending solutions for the prevailing problems, respondents were asked to select from the choices given.

The responses for each of the questions are compared as presented herein below.

A. The Practice concerning Time Management.

1. Which method do you use to symbolize project planning and scheduling?

Table 4.7: Usage of planning method

| Item | Description | Percent (%) | |
|---|---|---|---|
| | | Local Contractors | International Contractors |
| a | Bar Chart | (50) 6 | (20) 2 |
| b | Critical Path | (50) 6 | (50) 5 |
| c | S- curve | - | (30) 3 |
| d | Others | - | - |

Table 4.7 shows that bar chart and Critical path methods are frequently used by Local contractors to symbolize project planning and scheduling. This question is aimed to look the views of the respondents with respect to whether they plan or not.

Bar Charts are a way to graphically show progress of a project. Management of a project is made easier if it is viewed as small manageable items where the dependencies are visually illustrated, parallel processes are discovered, the overall processing time determined and progress tracked. The tasks of a project can be quite complex and dependent on each other. With a project management tool, such as a Bar chart, all subtasks of a task can be viewed graphically.

The critical path method is a step-by-step project management technique to identify activities on the critical path. It is an approach to project scheduling that breaks the project into several work tasks, displays them in a flow chart, and then calculates the project duration based on estimated durations for each task. It identifies tasks that are critical and time-wise in completing the project.

Critical path, S-curve and Bar chart are found out to be the frequently used methods to symbolize the project planning and scheduling by the International contractors. S-curves are an important project management tool. They allow the progress of a project to be tracked visually over time, and form a historical record of what has happened to date. Analyses of S-curves allow project managers to quickly identify project growth, slippage, and potential problems that could adversely impact the project if no remedial action is taken.

Even if the use of S-curve is limited to the International contractors, the use of different methods to symbolize project planning and scheduling by both groups of contractors is encouraging.

2. How often do you formally meet with your project team for discussion of monitoring, updating and controlling progress on site?

Table 4.8: Frequency of formal meeting in projects

| Item | Description | Percent (%) | |
|---|---|---|---|
| | | Local Contractors | International Contractors |
| a | Daily | - | 20 (2) |
| b | Weekly | 66.6 (8) | 60 (6) |
| c | Monthly | 33.3 (4) | 20 (2) |
| d | No | - | - |

Table 4.8 shows that Local contractors meet most of the time on weekly basis and sometimes on monthly basis. On the other hand International contractors meet most of the time on weekly basis as the Local contractors and sometimes on daily and monthly basis.

Monthly meeting are ideal to discuss, review and decide on all matters relevant to the Contract Works. Weekly meetings shall be carried out on-site to discuss site Issues and a working session

by site personnel in temporary site offices. Daily meeting are required in the case of sensitive and very critical works.

In general, site meetings in construction works are important aspects of good project management. Holding regular site meetings of several forms, between employers, contractors, vendors, suppliers and all those related in the contract works are crucial for success. Failures of projects are mostly attributed to lack of project management and one of the key components is a lack of any adequate and proper Meetings between all relevant parties.

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

Table 4.9: Coordination frequency of current schedule with master plan

| Item | Description | Percent (%) | |
|---|---|---|---|
| | | Local Contractors | International Contractors |
| a | Weekly | - | 60 (6) |
| b | Monthly | 33.3 (4) | 20 (2) |
| c | Quarterly | 66.6 (8) | 20 (2) |
| d | No | - | - |

As can be seen from Table 4.9 most of the Local contractors coordinate their schedule with master schedule on quarterly and monthly basis. Whereas most of the International contractors coordinate their schedule with master schedule on weekly bases and some on monthly and quarterly basis.

Coordinating and updating of a schedule with master schedule depends up on the project duration, type of work and project complexity. To coordinate and update a schedule the weekly, monthly and quarterly can assist in evaluating time performance of project comparing with base schedule.

Since scheduling is related to time control and updating contractors should coordinate their schedule with the master schedule on weekly basis in order to have a continuous monitoring, controlling and updating of their time performance.

B. The Practice concerning Cost Management.

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

Table 4.10: Application of earned value concept

| Item | Description | Percent (%) | |
|---|---|---|---|
| | | Local Contractors | International Contractors |
| a | Yes | - | 80 (8) |
| b | No | 33.3 (4) | - |
| c | Sometimes | 66.6 (8) | 20 (2) |

Table 4.10 shows that the application of actual cost and earned value concept in controlling cost for the project is most of the time used by the International contractors and rarely by the Local contractors.

Earned Value is a program management technique that uses “work in progress” to indicate what will happen to work in the future. Earned value concept gives managers greater insight into potential risk areas. With clearer picture, managers can create risk mitigation plans based on actual cost, schedule and technical progress of the work.

The use of actual cost and earned value concept by the International contractors provides them a system for evaluating the performance of the project through integrating cost, schedule, and work. This will assist for evaluation of cost and time performance of projects.

Without the use of actual cost and earned value concept by the Local contractors it would be very difficult to calculate cost and schedule variances and performance indices and forecasts of project cost and schedule duration. It will also be very difficult to provide early indications of project performance to highlight the need for eventual corrective action.

2. Do you have a cost Engineer who is only responsible for dealing with cost control?

Table 4.11: Availability of a Cost Engineer on site

| Item | Description | Percent (%) | |
|---|---|---|---|
| | | Local Contractors | International Contractors |
| a | Yes | 33.3 (4) | 60 (6) |
| b | No | 66.6 (8) | - |
| c | Sometimes | - | 40 (4) |

Table 4.11 shows that most of the Local contractors do not assign a responsible Cost Engineer for dealing with cost. On the other hand most of the International contractors assign a responsible Engineer for dealing with cost.

Cost engineering is the engineering practice devoted to the management of project cost, involving such activities as estimating, cost control, cost forecasting, investment appraisal and risk analysis. Cost Engineers budget, plan and monitor investment projects. They seek the optimum balance between cost, quality and time requirements.

Since Cost Engineer's judgment and experience are utilized in the application of scientific principles and techniques to problems of estimation, cost control, business planning and management science, profitability analysis, project management, and planning and scheduling, contractors shall have them on site as a basic requirement.

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

Table 4.12: Usage of software to plan, monitor and cost control

| Item | Description | Percent (%) | |
|---|---|---|---|
| | | Local Contractors | International Contractors |
| a | Yes | 33.3 (4) | 60 (6) |
| b | No | 66.6 (8) | - |
| c | Sometimes | - | 40 (4) |

Table 4.12 shows that most of International 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. 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. But the use software by the Local contractors is minimal and it will have effect on their overall performance. If properly applied information technology management leads to performance improvement in the construction industries.

## *4.8 OBSERVATIONS OF THE CONTRACTORS ON THE CURRENT SITUATION*

Through the following open ended questions respondents were asked to give their opinion as to what is going on at the moment and what needs to be done in the future to perform projects in a better way. The responses for each of the questions are summarized as presented herein below

### 4.8.1 Result to open ended questions from Local contractors.

1. What is it that you lack to compete with foreign contractors?
    - A clear and well defined strategy to carry out big and complex projects.
    - Easy access to get foreign currency to purchase heavy machineries and spare parts.
    - Experience on such big projects.
    - Capital cost of the company.
    - Convenient Government policy
    - Capability to import machineries.
    - Capability to hire highly experienced professionals.
    - Learning from past performance.
2. What do you think ERA should do to increase your competence?
    - Training top management.
    - Revise Training of employees.
    - Arranging loans to invest machineries.
    - Revise the annual turnover required for Local contractors.
    - The technical requirement required for Local contractors.
    - Encourage those contractors who perform in a better way.
    - Facilitate payments.
    - Facilitate claim request.

3. Do you accept the saying that says "Foreign contractors are better in all aspects of performance"? Why?

    - They are in a better position with respect to liquid cash.
    - It is easy for them to inject any qualified and competent staff at any time.
    - It is easy for them to supply any resource which the project demands.
    - They have better International experience.
    - They are highly supported by their own Government.
    - They have the capability to import highly mechanized equipments which can improve the time and quality of the work.
    - They have no problem with foreign currency since they are not totally paid in Birr.
    - It is easy for them to negotiate with anyone, even with higher officials to resolve problems that may arise.

4. How do you observe the availability and quality of International contractors now and their participation and in the future (increase or decrease)? Why?

Availability:

- The number of foreign contractors especially the Chinese is increasing.
- Most of the market share of the work is taken by the foreign contractors.
- They are available because the whole system is favorable to them.

Quality:

- It is not easy to generalize but most of them perform in a better way and quality.
- Their quality of work is most of the time less than the Local contractors.

Future participation:

- As long as there is fund from other countries their participation will continue.
- It will increase unless the current award system established by PPA, which invites foreign contractors to the market and discourages the Local contractors, is revised.

- Their participation will increase unless the bid qualification criteria set by ERA, which excessively requires high turnover for Local contractors is modified.

### 4.8.2 Result to open ended questions from International contractors.

1. What is it that pulls towards you to work in Ethiopia?
    - The political and social environment stability.
    - The availability of International fund for big projects.
    - The development of the country.
    - The good relationship between Ethiopia and their countries.
    - The availability of infrastructure construction in the country ( good construction market)
    - Plenty of project opportunity.
    - The limited capacity and experience of the Local contractors.
    - The favorable legal system of the country.
2. How do you compare your performance in Ethiopia with other countries?
    - Better and promising than other African countries:
    - Very safe to work and live (safe in the day and in the night)
    - No terrorist, no danger and almost no corruption.
    - Different countries share different characteristics, and trying to improve our long term cooperation with the employer.
    - Sometimes difficult due to fluctuation of tax system.
    - The devaluation of the currency is high compared to other countries.
    - Difficult to clear jurisdictional issues.
    - Poor banking system (banks act as a mediator).

3. Do you see any gap that ERA should fulfill to help Contractors finish projects on time, with allocated budget, best quality, etc..?
    - The best strategy is to follow the requirements and directions of the client and deeply communicate with the supervisors.
    - Clear right-of-way issues prior to signing contract to complete projects according to the schedule.
    - ERA should revise the selection criteria of contractors and consultants.
    - Resolve claims as fast as possible before disputes follow.
    - Help facilitate custom clearance problems.
    - ERA to have highly qualified and experienced personnel's to deal with the overall performance of the projects.
    - ERA to adapt new technologies to speed up its overall operations.
    - ERA to arrange training and competence development assistance to professionals and management staffs.
4. How do you observe the availability, quality and participation of Local contractors in Ethiopia now and in the future?
    - They are limited in number and almost none for bigger projects from WB and ADB.
    - They have capacity problem.
    - They are not well experienced to manage big projects.
    - The quality of their work is poor due to lack of equipments and skilled professionals.
    - In bigger projects it is even difficult for them guarantee security bond.
    - The Local contractors are good especially for earth work.
    - The problem with Local contractors is they don't have enough equipment.
    - The Local contractors need training to work with the International contractors.
    - Unless supported by ERA their number will decrease in the future.

## *4.9 DISCUSSION*

To identify the critical factors affecting performance of both groups of contractors, the identified factors were ranked in their order of importance. The following steps have been followed to rank the factors and sort out the critical ones.

- Relative importance indices have been carried out using statistical method.
- Factors have been ranked in the order of their importance for each factor.
- Importance indices have also been determined for each of the ten major causes affecting performance by taking the average of the importance indices under each group.
- The major groups of factors affecting performance have also been ranked and the degree of agreement and significance level of the sets of rankings were determined.

The ranking of factors that affect the performance of both Local and International contractors is summarized by selecting the 10 major factors among the 37 factors in which 30% are from Cost factors, 30% from Time factors, 20% from client related factors, 10% from Quality factors and 10% from People factors.

When compared with factors affecting performance of other countries, most of the factors are the same but the degree of impact is unlike in different countries.

Response for six Cost and Time management questions and four open ended questions for each group has also been compared and analyzed. The major 10 factors are discussed for each of the five groups in the discussion part.

Based on the identified factors these part of discussion addresses mitigation measures following the outcome of the study in order to minimize the major affecting factors and their effects.

Table 4.13 shows the RII and Rank of factors affecting performance of both Local and International Contactors by main categories.

Table 4.13: Rank of factors by category affecting performance of contractors.

| No. | Factors | Local Contractors | | International Contractors | | Both Contractors | |
|---|---|---|---|---|---|---|---|
| | | RII | Rank | RII | Rank | RII | Rank |
| 1 | Cost | 0.820 | **1** | 0.580 | **3** | 0.70 | **1** |
| 2 | Time | 0.714 | **2** | 0.679 | **1** | 0.70 | **1** |
| 3 | Client related | 0.687 | **3** | 0.613 | **2** | 0.65 | **3** |
| 4 | Quality | 0.713 | **5** | 0.563 | **5** | 0.64 | **4** |
| 5 | People | 0.687 | **3** | 0.550 | **6** | 0.62 | **5** |
| 6 | Productivity | 0.667 | **7** | 0.567 | **4** | 0.62 | **5** |
| 7 | Innovation and Learning | 0.683 | **6** | 0.550 | **6** | 0.62 | **5** |
| 8 | Health and Safety | 0.650 | **8** | 0.517 | **8** | 0.58 | **8** |
| 9 | Environment | 0.625 | **9** | 0.425 | **9** | 0.53 | **9** |
| 10 | Regular and Community | 0.475 | **10** | 0.350 | **10** | 0.41 | **10** |

From the data collection and analysis, major factors affecting performance Local and International contractors in road projects administered by ERA, it is found that major group factors in performance of project implementation are:

1. Cost factors
2. Time factors
3. Client related factors
4. Quality factors
5. People factors.

Therefore, based on the response and analysis the following discussion and mitigation measures are indicated for the above major factors.

### 4.9.1 Cost Factors

Without a doubt, every project is dependent on its cost or budget. Cost has been addressed as a very important success criterion, where as having an intellectual budget plan and proper cost estimation have been mentioned as prominent success factors in some studies.

In these thesis respondents agree cost factors as one of the major factor affecting performance of contractors. The major category consists of five factors. Among these the respondents agree that

problems related to liquidity of the organization, poor cash flow, escalations of material price and Differentiation of currency prices are the main ones. Even if the problem affects both groups of contractors, it has higher degree with the Local contractors.

The limited capacity of Local contractors has become a serious challenge for themselves and even ERA. The Local contractors are characterized by inadequate capital base. To carry out a project with the intended cost, contractors need to have enough amount of liquid asset which is cash or financial liquidity of company's assets which is the ability to convert assets into cash. Appropriate resources of liquid elements of the assets, including cash, are the company's protection against the loss of financial liquidity.

Cash is a company's lifeblood. In other words, a construction company can carry out different projects and have good net earnings, but if it can't collect the actual cash on a timely basis, it will soon fold up, unable to pay its own obligations. The most common and the most frequently used concepts of financial liquidity concern mutual relations between current assets and those current liabilities which are financed from current assets. This is then the asset-equity aspect of financial liquidity. Financial liquidity of an enterprise may be defined as the ability to settle its liabilities (short-term ones, payable within one year) on time, determining the possibility of paying these liabilities in a situation when they become due instantly, through liquidizing possessed high-liquidity assets (current assets). Financial liquidity of an enterprise is better when larger parts of its assets are high-liquidity elements, and worse when the opposite is true. The mutual relationship between assets and liabilities in shaping financial liability also requires that we pay attention to the quality of our debts. Financial liquidity is better when the due time of their payment is distant, that is when current liabilities constitute a smaller part of all liabilities. Therefore, if an enterprise wants to maintain high level of financial liquidity, it must possess a large share of cash and high liquidity assets and a small share of short-term liabilities.

The enterprise's solvency is defined not through the quality (size, structure, liquidity) of the possessed current assets, but by the generally understood ability to pay with cash. This possibility is determined by cash flows; therefore company solvency is a cash aspect of financial liquidity (Monika Bolek, 2012).

Since all this cannot be easily achieved by the will and power of the contractors, ERA should interfere and help the contractors by upgrading their capacity. Even if ERA says in its last fifteen

years of RSDP the impact of the program in building the capacity of the local construction industry is encouraging in terms of both the value and numbers of projects, the Local contractors are still facing the problem and most of the big projects are being carried out by the International contractors. As part of capacity building ERA together with the contractors shall look deep into the problem and find better solution to get projects completed as planned.

The other major cost factor affecting both groups of Contractors and specially the Local contractors is lack of control over cash flow. Frequently contractors experience cash flow problems. It's the nature of the business. However, careful planning can help identify small problems before they become bigger, and adopting several simple cash management strategies can help contractors manage and control cash flow.

The causes of cash flow problems are many. For example, poor utilization of advance payment, when contractors pay suppliers and subcontractors before they receive any payment from the owner of the project they are working on, a cash crisis can result. Other practices that can lead to cash shortages are maintaining excessive inventory, using cash to buy equipment instead of leasing or financing these purchases, allowing large gaps between the time it takes to bill and the time it takes to collect receivables, and using available cash for outside investments or for advances or loans to officers.

Proper cash flow planning helps contractors make better use of budgets, employ financing and capital more effectively, increase revenues, and boost profits. To analyze cash receipts and disbursements, contractors must know when the work on varying aspects of a project will be performed. This timeline can be used in conjunction with the contract to map out expected cash flows related to the project. If a contractor's bills aren't paid on time, creditors may demand that future purchases be paid for in cash. Interest and penalty charges on unpaid balances can quickly compound.

Contractors can better control cash outflows by implementing an automated accounts payable system to organize payments by due date. Unless they receive an early payment discount, contractors should pay bills when due and not before. It may be possible to negotiate with key suppliers for longer payment terms. In addition, contractors experiencing cash flow problems should review existing bank loans to see if they might be restructured under better terms.

Ideally, contractors should be able to generate up-to-the-minute information on the status of each outstanding account. Project managers should have reports that show due dates for project progress payments. The reports should include the date the last bill was sent, the date the last payment was received, the current balance, and, when required, the number of days delinquent. Managers should contact customers soon after payment is due to determine why payment has been delayed and to obtain a schedule from the customer that indicates when payment will be made.

Contractors should also focus on collecting retentions. It's important to develop and implement procedures to complete punch-lists, as-built drawings, owner's manuals, and other submittal requirements. Once this information is made available, a contractor is proficient to push for the release of funds from the project agency or owner. Delays in collecting payments for work performed can weaken a company's working capital position. Without adequate working capital, a contractor may not be able to take advantage of opportunities that become available. Cash flow management is essential if a business is to survive and thrive (Knopf, 2009)

Escalation of material price is among the major cost factor affecting performance of both Local and International contractors. Escalation of material prices affect the liquidity of contractors and profit rate of their projects.

Escalation refers to cost changes which result from changes in price levels. These changes in price levels in turn are driven by underlying economic conditions. Escalation can be driven by change in productivity, technology and market condition including high demand labor and material shortage, profit margin and other factors.

While differentiation of currency prices is one of the major factors affecting the performance of the Local contractors, it is on the other hand not a major factor for International contractors. This is due to the way payments are arranged for contractors by the contract agreements. International contractors are most of the time paid by Birr and Foreign currency while the Local contractors are paid by Birr only. It is not easy for the Local contractors to have access to foreign currency for purchasing of machineries and other equipments required by the works.

### 4.9.2 Time Factors

'Time' or 'Schedule' is one of the most important project success criteria for any project. Time has been addressed as a criterion by which to evaluate a project's degree of success. It has also been mentioned as a factor, which can help the other factors/criteria be met. It is found that the definition of 'Time' is of great importance. 'Time' as the date when a project is most likely to end can be a criterion, but 'Time' as a manageable component might be considered as a factor.

This major category consists of three factors. Among these the respondents agree that delay due to right- of-way problem, delay due to claim approval and poor project time estimation are major causes for performance of both groups of contractors.

Contractors lose their time, money and other resources due to right-of-way problem as their machineries will be idle or forced to work in a less efficient manner or even to stop work for some time.

In most cases the main points related to these problems are preparing compensation, finding replacement houses or land, giving adequate time for the resident prior to leaving their houses and relocation of utility lines. The entire task requires the involvement, coordination and devotion of many administration offices and awareness of the public.

Right-of-way problem results in a number of costs on any project as price escalation due to extension of time, additional overhead cost on the contractor and on the overall progress of the works for it will no longer be in accordance with the agreed contract.

The right-of-way acquisition process can begin before the design is completed. The procedure is to have a roadway design team leader to prepare a backup documentation to support the design decisions and to provide it to the right of way team. Careful consideration and good practical coordination in dealing with the problem by the roadway design team during the plan development phase can reduce the time and costs associated with the acquisition process. The task of the right- of -way team, which consists of appraisers, land planners, engineers, accountants and other experts, is to estimate fair market value of the property being acquired. After reviewing the work of the road design team, the work will extend onto the property to address the issue to concerned parties.

Although, ERA in its five year Right-of-way clearance plan propose to clear right-of-way before construction is tendered, practically it is observed that the right- of- way problem exists and remains to be the main challenging part for contractors.

Since right-of-way problem is mainly related to the Client, ERA shall play the main role by working in coordination with local administrations on the removal of individual houses, businesses and other properties and with Ethiopian Power Corporation and Ethio Telecom on the clearance of power and Telecom lines from right-of-way of road projects.

Delay due to claim approval is the other major factor which is affecting both groups of contractors. A claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, and extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the parties to a Contract involved in the County's construction and repair projects arising out of or relating to the Contract or the construction process. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

Prior to an amicably negotiated settlement, the contract documents usually require the contractor to place his claim demands at the jurisdiction of the Engineer. The Engineer is also required to act impartially. Should both parties consider the decision of the Engineer to be fair, then the parties will agree to settle the issue. If one or both parties, however, do not accept the decision of the Engineer, then an alternative dispute resolution mechanism is instituted. This usually leads to negotiating amicable settlement or finally to arbitration. Such occurrences of claims are the source of disagreements and may sometimes result in disputes that could lead to arbitration proceedings.

In case a dispute occurs, forms of contract, such as the FIDIC form, set out details of the submission and resolution of claims. These can be summarized as follows: Submission of claims by contractor, Review of claims by the Engineer, Decision by Engineer, Negotiation and/or amicable settlement, Disputes review expert/board and Arbitration.

The above stages of formulation and/or submission, assessment, disagreement, negotiation of claims are in itself a complicated process. In order to avoid a complicated costly and time

consuming arbitration proceeding, parties to a contract may institute an Alternative Dispute Resolution (ADR) as an option of claim settlement which may include: Direct Negotiation, Mediation, Conciliation, Mini-trail procedure, Claims review board (CRB); and Pre-arbitral review board.

In the event the above options fail, then, Arbitration proceedings may follow.

Even though ERA confirms that under normal condition, all claims are settled amicably by the committee consisting of members from the client, the consultant and the contractor, and do not lead to arbitration, practically most of the claims are not settled on time and are leading to additional problems to all involved in the project.

The significant effect of the claim process is the effect it may have on the project execution itself. Once the claim issues are referred to arbitration, the parties begin to see each other as enemies and that will have a far greater impact, probably more severe than the financial impact that will have on the total project life. Therefore at the same time as maintaining firms stand in the handling of possible claim cases, responsible bodies should attempt to maintain an atmosphere of good working relationship in the interest of the project.

Both groups of respondents agree that poor estimation of project time by the client is affecting their performance. ERA has been managing comparatively large road and bridge construction projects through several local as well as international contracts each year. Only few projects have successfully completed within intended schedule while many projects are facing significant time over run.

The duration of a construction project depends primarily on the quantity or magnitude of the construction work and the productivity of the construction crew. In addition, many other factors may also affect the construction duration, such as the type of construction, location and any special features of the project. It is true that there is no scientific method and scheduling technique being applied in determining the real contract period necessary for the completion of the projects in various geographical locations and working conditions.

The method being applied till date to determine contract duration for construction projects in ERA is mostly informal irrespective of geographic complexity, nature of work and the workable day considerations. Similarly the contract duration is inconsistent in different projects.

Each project is assigned a certain time for completion based on the experience of the estimator. So there is a large discrepancy on the time period allocated for even similar sized contracts within ERA.

Construction time estimation is an integral part of preparation of an engineer's estimate. Estimation of construction time is important from various aspects e.g. for project planning and scheduling, project cash flow forecasting and for efficient contract administration. In construction contracts provision of bonuses for contractors who finish works earlier or imposing penalty for those delaying the works could be provisioned if an objective method of calculation of project time is available.

One of the main goals of successful construction project management system is to complete the project on time. In order to meet the deadline of a project, a proper estimation should be sought. After the proper time estimation of projects is successfully completed, it is very essential to consider some unexpected risk factors which can affect the normal working environment. Considering these unexpected risk factors will allow being flexible enough to accommodate changes without negatively affecting the overall duration of the project.

ERA most of the time predetermines the duration to complete the projects on the basis of the period to which financial resources are available for the particular project.

Even if it is ERA's responsibility to fix a realistic and logic based methodology for estimating contract duration for the construction projects, it mostly fails due to absence of performance data base that could be helpful to develop credible time estimate and not considering time contingency.

However, it would be a good practice to consider unexpected risk factors and request input from contractors concerning the time required for the accomplishment of the work, for they are in the best position to provide judgment.

### 4.9.3 Client Related Factors

A client is potentially anyone who, in carrying out a business or other undertakings, whether for profit or not, initiates a project which includes construction work. The client must ensure that designers, coordinators, contractors and other members appointed to the project team are competent and have adequate resource to carry out their responsibilities under their respective contractors.

In this thesis respondents agree that factors related to the client are highly affecting their performance. The major category consists of four factors. Among these the respondents agree that problems related to number of disputes between client and project parties and leadership skill of project manager are major ones. The number of dispute between client and the project team is ranked second with the International contractors.

Since International contractors work outside their country a combination of environmental and behavioral factors can lead to construction disputes. Road projects are usually long-term contact with high uncertainty and complexity, and it is impossible to resolve every detail and forecast every unforeseen event at the start. As a result, situations often arise that are not clearly addressed by the contract.

The basic factors that drive the development of construction disputes are:

Uncertainty- the difference between the amounts of information required to do the task and the amount of information available. The amount of information required depends on the task complexity and the performance requirements, usually measured in time or to a budget. The amount of information available depends on the effectiveness of planning and requires the collection and interpretation of that information for the task.

Contractual problems- Standard forms of contract clearly prescribe the risks and obligations each party has agreed to take. Such rigid agreements may not be appropriate for long-term transactions carried out under conditions of uncertainty.

Behavior- Since contracts cannot provide for every possible occurrence; wherever problems arise either party may have an interest in gaining as much as they can from the other. Equally, the parties may have a different perception of the facts. At least one of the parties may have

unrealistic expectations, affecting their ability to reach agreement. Alternatively, one party may simply deny responsibility in an attempt to avoid liability.

Since no construction method is perfect, parties entering into any construction contract may find it very beneficial to give attention, early in the contracting process, to the fast provision of some mechanism for resolving disputes. Out-of-court methods of dispute resolution have become increasingly popular. The choice of non judicial mechanisms for the resolution of contract disputes is motivated, at least in part, by the desire to avoid ever-increasing costs and time involved in litigation (Rimmington, 2016).

Leadership skill of project manager is also a major factor affecting performance of contractors.

The project manager's responsibility is to manage the financial, technical and schedule requirements of the project in such a manner as to bring the project in on-time, within budget and with a technical quality that meets or exceeds the contractual performance specifications.

While experience in engineering and construction is important, the critical skills needed to be a successful project manager (PM) are not technical. They are leadership and management skills that will help to lead and manage the project in such a manner that the project's objectives are achieved. Leadership is the process of influencing individuals or groups to accomplish an organizational goal or mission. Management is the process of planning, organizing, directing and controlling a project or activity.

### 4.9.4 Quality Factors

Quality, whether it concerns the product or process, has been considered as both a project success criterion and factors. Some researchers named it quality performance and considered it as a major project success criterion. In addition, some other researchers addressed quality as a criterion under the name of product's quality. On the other hand, some researchers considered quality management process as a project success factor, which facilitates the success of other criteria and factors.

The major category in the quality factor consists of four factors. Among these, the respondents agree that unavailability of personals with high experience and qualification as a major cause affecting their performance. This factor is ranked in fourth position with the Local contractors and in twelve’s position with the International contractors.

For International contractors this factor is not as critical as those of Local contractors for they have a choice and capacity to recruit any personnel from local market and abroad.

Contractors undertake a wide range of technical and physical tasks which require huge employment. The task to recruit and manage these employees is complicated and challenging. Road construction work requires various professionals at various levels to undertake each activity. The quality of each activity depends on the availability, experience, capacity and qualification of employees assigned to the task.

Sometimes due to unavailability of experienced and qualified personnel and poor human resource management, to cut costs, Local contractors assign junior and inexperienced staffs resulting in poor performance which cause damage to the project and the contract itself.

ERA has been training more than 3000 Engineers in second degree in related fields drawn from Local contractors, consultants and road agencies to overcome the encountered challenge, but the problem still exists because the graduates are not assigned to the fill gap and most of them are working in other sectors of the construction industry (ERA, 2013).

Therefore, even if the production of manpower is primarily the responsibility of the education sector, ERA in conjunction with the Government and all stakeholders should develop and implement additional strategies to deal with the lack of experienced and qualified technical and management skills in the construction sector. ERA together with the contractors shall also take initiatives to offer on-the-job training courses to the professionals involved in the road projects.

### 4.9.5 People Factors

In all projects almost all activities are dependent on human resources. In other words, it is fast becoming accepted wisdom that it is people who deliver projects and indeed people, who are directly involved in a project, facilitate achieving project goals and consequently 'Project Success'. A project team and its members are a key part of the human resource list of a project. Different researchers have introduced some project success factors, which are all related to having a competent project team.

In this thesis respondents agree that people factors are highly affecting their performance. The major category consists of four factors. Among these the respondents agree that problems related to Recruitment of employees and competence development is major one.

The word recruitment has many meanings and plays an important role. Employees leave the organization, some retire and some die in saddle. The most important thing is that company grows, diversifies and takes over other units all necessitating hiring of new men and women. Recruitment function stops only when the organization ceases to exist. Therefore recruitment is a process of searching for obtaining applications of job from among the right people who can be selected.

A competent workforce is the core of any successful company. Without employees that perform at a high level each day, a company will loosen and fail. The key to having competent employees is implementing an effective recruiting and training process. Successful recruiting techniques focus on identifying strong candidates, while successful training techniques consist of providing as much guidance as possible to new employees before letting them jump into their new positions.

Recruitment of employees and competence development has direct relationship with the unavailability of personnel with high experience and qualification. It is after having experienced and qualified personnel that the recruitment of employees can become easy and possible.

# 5. CONCLUSIONS AND RECOMMENDATIONS

This thesis has examined the various types of factors which have a significant negative impact in the performance of both Local and International contractors in road projects administered by ERA. The main objective of this thesis was to identify and make recommendation on the factors affecting performance of these groups of contractors in road construction projects which are administered by ERA. Based on this research objective the following conclusions are awarded and recommendations forwarded.

## *5.1 CONCLUSIONS*

1. The major factor that is affecting both groups of contractors is found out to be delay due to right-of–way problem. Since there is no clear coordination between the client ERA, local administrations and the public, the problem is worsening. It is a major factor for both groups of contractors because contractors lose their time, money and other resources and will be forced to work less efficiently or even be idle.
2. Delay in claim approval which is a result of claims not settled on time by ERA is leading to dispute between owner and the projects parties and it is highly affecting both the Local and International contractors and the performance of projects. As a result of these the problem is reflecting on the relationship between them and the performance of project.
3. Problems related to liquidity of the organization and cash flow which are most of the time results of inadequate capital base and lack of control over cash flow, inappropriate use of advance payment, not closing out completed projects and low unit rates fixed during tendering, etc. are among the major problems which are greatly affecting the performance of Local contractors.
4. Most of the time, the estimation of the project time, which is predetermined by ERA based on the availability of financial resources is affecting both the Local and International contractors. The estimation of the project is found out to be unpractical and as a result both groups of contractors are suffering from delay and dispute.
5. It is observed that the availability of personnel with high experience and qualification and recruitment of employees and competence development is a major problem for the construction industry.

6. The presence of competent Project Manager in a construction firm is basic to achieve the goals of a project. Problems related to lack of Leadership skill of project manager is affecting the performance of projects in the construction industry.
7. International projects involve many uncertainties and risks not found on domestic construction projects. It is found that jurisdictional risks like implementation of new tax, dispute resolution and enforcement, economic feasibility, governing law of contract, importation, customs and visa issues, political and social stability and sub contractors and supply chain quality as major factors affecting performance of International contractors.
8. From the practice concerning time management, it is found out that the method to symbolize project planning and scheduling, the frequency of formal meeting in projects and coordination of schedule with master plan by Local contractors is by far below from those of International contractors.
9. Concerning the practice from cost management, it is observed that the application of earned value concept, availability of cost engineer to deal with cost control and application of software to plan, monitor and control cost by the Local contractors is again by far below from those of International contractors.
10. Most of the Local contractors are not comfortable with the selection criteria of ERA which they say most of the time favors' International contractors.
11. It is observed that most of the current market share of the work is taken by the International contractors and the Local contractors don't seem to be confident enough to compete with them.
12. Due to availability of plenty of road projects in the future in Ethiopia and the limited capacity of the Local contractors in Ethiopia, the International contractors seems to be confident enough to have plenty of Project opportunity in the future.

## *5.2 RECOMMENDATIONS*

The goal of this research is to identify critical factors affecting the performance of Local and International contractors in road projects administered by ERA. To this end the following recommendations are forwarded to the client ERA, Local contractors and International contractors to reduce the adverse effects on performance of projects.

**For Local contractors:**

1. Local contractors should ensure that they have enough capital base and proper cash flow to execute the works and abstain from the practice of diverting particular project funds to non-project activities to avoid being cash-strapped during the execution of the works.
2. The Local contractors should ensure that they have adequate experience for a required assignment, deploy competent project team and employ appropriate construction methods for the required assignment.
3. The Local contractors should ensure proper planning and scheduling of the works and ensure effective site management and supervision of the works so as to keep watch on critical activities and try hard to complete projects within the specified time while meeting quality and cost requirements.
4. The Local contractors, for better control of cost, shall make use of earned value concept to calculate cost and schedule variances and performance indices and forecasts of project cost and schedule duration. This concept can provide early indications of project performance to highlight the need for eventual corrective action.
5. For better control over cost, Local contractors need to assign a Cost Engineer and use of application of software to plan, monitor and control cost to deal with cost control.

**For International contractors:**

6. International contractors are required to have project knowledge of Ethiopia (the specific country they plan to work with) as social norms, expectations and local preferences, cultural issues, approval processes, operating law; material and labor quality, differences encountered in work practices, cultural differences, design and construction standards and permit processes. Understanding these differences and fine distinction in different

countries is therefore expected to reduce these risks, thereby increasing the success of global projects.

**For ERA:**

7. ERA to establish independent right-of-way team to deal with the issue of right-of-way and start the process even before design is completed. It is also the responsibility of ERA to play the main role by working in coordination with local administrations on the removal of individual houses, businesses and other properties and with Ethiopian Power Corporation and Ethio Telecom on the clearance of power and Telecom lines from right-of-way of road projects.
8. ERA and both groups of contractors should ensure that approval of claims is stipulated with the time-frame so as to facilitate the progress of works to ensure timely completion.
9. Capacity building of high level professionals and intermediate skilled personnel shall be given prior attention. ERA shall take the initiative to conduct short term seminars and workshops to upgrade the capacity of all personnel involved in the road construction projects.
10. ERA should ensure that proper planning, costing of the works and proper estimation of project time are made during the pre-contract period so as to avoid intermittent stoppage of works as a result of funding constraints since this not only increases the construction period but also impacts on the contractors overhead costs and costs associated with mobilization and demobilization during the period within which the works were suspended.
11. To have competent Local contractors now and in the future, ERA should work hard to increase their capacity and number, facilitate ways to arrange loans and foreign currency from banks, revise the selection criteria and arrange trainings to both management and employees of the contractors.

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## *APPENDICES- A*

Questionnaire

Dear participants,

I am currently working on a research on Comparative Analysis of Factors Affecting the Performance of Local and International contractors on Road Projects administered by ERA, as a partial fulfillment for my MSc study in Construction Technology and Management at the AAU. This research is aimed to Investigate, Compare and Identify the Factors Affecting Performance of Local and International contractors and to recommend appropriate measures gained from best practices.

It is therefore important to identify factors/ variables of performance management towards the project success criteria i.e. time, cost, quality, productivity, Client Satisfaction and others in both Local and International contractors currently working with ERA and rank them in their order of severity before conducting analysis and subsequent recommendation of the solution towards achieving success.

To successfully conduct this research, it is mandatory to look into the issues from different perspectives by involving professionals who have experience in the Ethiopian Road Construction sector. In this respect, you are among the one who can give the correct information; hence I kindly request you to respond to the questions.

I would like to confirm you that your response will be kept strictly confidential and it will be used exclusively for the purpose of this research. Besides, your quick response is extremely important in order to finalize the research timely and I would appreciate if you complete and return it within one week of your acceptance of same.

Thank you very much for your time and cooperation, and looking forward to receiving your response.

Yours faithfully,

Azeb Getahun

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# Section 1

General Background Information

The questions below are related to your organization and yourself. Please indicate your response by ticking (X or √) in the appropriate box and by also filling the blank spaces provided as appropriate.

1.1. Name of organization: _____

1.2. Type of organization:

Employer ☐ Contractor ☐ Consultant ☐

Other ☐ (Please specify):_____

1.3. Years within the organization since establishment:

< 5 years ☐ 5-10 years ☐ >10 years ☐

1.4. Your work experience in relation to projects administered by ERA

< 5 years ☐ 5-10 years ☐ >10 years ☐

1.5: Your name, Title and Contact address

Name (Optional):_____

Job Title: _____

Contact address (Optional):_____

E-mail: _____

Tel: _____

# Section 2

Below are numbers of factors, identified from Literature review and personal experience, affecting the Performance of International and Local Contractors. Please think in terms of your organization's experience and /or your knowledge about the degree of impact and frequency of occurrence of the under listed factors on road projects and respond by ticking (√) in the column representing your selection.

| I/No. | Factors Affecting Performance | Degree of Impact | | | | |
|---|---|---|---|---|---|---|
| | | Very High | High | Moderate | Neutral | None |
| **A** | **Cost factors** | | | | | |
| 1 | Liquidity of the organization | | | | | |
| 2 | Cash flow of project | | | | | |
| 3 | Cost of material and equipment | | | | | |
| 4 | Escalation of material prices | | | | | |
| 5 | Differentiation of currency prices | | | | | |
| **B** | **Time factors** | | | | | |
| 6 | Poor estimation of the project time | | | | | |
| 7 | Average delay due to Right- of- way problem | | | | | |
| 8 | Percentage of orders delivered late | | | | | |
| 9 | Average delay in claim approval | | | | | |
| 10 | Average delay in regular payments | | | | | |
| 11 | Unavailability of resources | | | | | |
| 12 | Average delay because of materials shortage | | | | | |
| **C** | **Quality factors** | | | | | |
| 13 | Conformance to specification | | | | | |
| 14 | Availability of personals with high experience and qualification | | | | | |
| 15 | Quality of raw materials | | | | | |
| 16 | Quality of equipments in project | | | | | |
| **D** | **Productivity factors** | | | | | |
| 17 | Number of new projects / year | | | | | |
| 18 | Management-labor relationship | | | | | |
| 19 | Sequencing of work according to schedule | | | | | |

| I/No. | Factors Affecting Performance | Degree of Impact | | | | |
|---|---|---|---|---|---|---|
| | | Very High | High | Moderate | Neutral | None |
| **E** | **Client satisfaction factors** | | | | | |
| 20 | Information coordination between owner and project parties | | | | | |
| 21 | Leadership skills of project manager | | | | | |
| 22 | Number of disputes between owner and project parties | | | | | |
| 23 | Number of rework incidents | | | | | |
| **F** | **Regular and community satisfaction factors** | | | | | |
| 24 | Cost of compliance to regulators requirements | | | | | |
| 25 | Number of non-compliance events | | | | | |
| **G** | **People factor** | | | | | |
| 26 | Employee attitudes in project | | | | | |
| 27 | Recruitment of employees and competence development | | | | | |
| 28 | Motivation of employees | | | | | |
| 29 | Belonging to work | | | | | |
| **H** | **Health and safety factors** | | | | | |
| 30 | Application of health and safety factors in organization | | | | | |
| 31 | Project location is safe to reach | | | | | |
| 32 | Reportable accidents rate in project | | | | | |
| **I** | **Innovation and learning factors** | | | | | |
| 33 | Learning from own experience and past history | | | | | |
| 34 | Learning from best practice and experience of others | | | | | |
| 35 | Training the human resourse in the skills demanded by the project | | | | | |
| **J** | **Environmental factors** | | | | | |
| 36 | Wastes around the site | | | | | |
| 37 | Climate condition | | | | | |

# Section 3

Below are numbers of factors, identified from Literature review and personal experience, affecting the Performance of International and Local Contractors. Please think in terms of your organization's experience and /or your knowledge about the degree of impact and frequency of occurrence of the under listed factors on road projects and respond by ticking (√) in the column representing your selection.

| I/No. | Factors Affecting Performance | Degree of Impact | | | | |
|---|---|---|---|---|---|---|
| | | Very High | High | Moderate | Neutral | None |
| 1 | Bussiness case / Economic feasibility | | | | | |
| 2 | Implimentation of new tax | | | | | |
| 3 | The cost, availability and utility of currency | | | | | |
| 4 | Insurance | | | | | |
| 5 | Legal entity establishment | | | | | |
| 6 | National Employment | | | | | |
| 7 | Political stability | | | | | |
| 8 | Social stability | | | | | |
| 9 | Cultural and religious issues | | | | | |
| 10 | Language difficulties | | | | | |
| 11 | Governing law | | | | | |
| 12 | Dispute resoultion and enforcement | | | | | |
| 13 | Sub contractors and supply chain quality | | | | | |
| 14 | Shipping and custom clearance | | | | | |
| 15 | Securing visas | | | | | |

# Section 4

The Practices Concerning the Factors Affecting the Performance of Construction Projects:

**A. Time management:**

Please circle the appropriate:-

1. Which method do you use to symbolize project planning and scheduling?
   a. Bar Chart b. Critical Path c. S- Curve d. Others
1. How often do you formally meet with your project team for discussion of monitoring, updating and controlling progress?
   a. Daily b. Weekly c. Monthly d. No
2. How often do you coordinate your schedule with master schedule of the project owner?
   a. Weekly b. Monthly c. Quarterly d. No

**B. Cost management:**

Please circle the appropriate:

1. Do you have the cost schedule associated with the estimated time schedule?
   a. Yes b. No c. Sometimes
2. Do you apply the actual value and earned value concept in controlling cost for the project?

a. Yes b. No c. Sometimes

3. Do you have a cost Engineer who is only responsible for dealing with cost control?
   a. Yes b. No c. Sometimes

# Section 5(a)

Open End Questions

Local contractors

1. What is it that you lack to compete with International contractors?

_____

_____

_____

_____

_____

_____

_____

2. What do you think the Government should do to increase your competence?

_____

_____

_____

_____

_____

_____

_____

3. Do you accept the saying that says “Foreign contractors are better in all aspects of performance”? Why?

_____

_____

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_____

_____

_____

4. How do you observe the availability, quality and participation of International contractors in Ethiopia now and in the future (increase or decrease)? Why?

_____

_____

_____

_____

_____

_____

_____

_____

# Section 5(b)

Open End Questions

International contractors

1. What is it that pulls towards you to work in Ethiopia?

_____

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_____

_____

_____

_____

_____

2. How do you compare your performance in Ethiopia with other countries?

_____

_____

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_____

_____

3. Do you see any gap that ERA should fulfill to help Contractors finish projects on time, with allocated budget, best quality, etc..?

_____

_____

_____

_____

_____

4. How do you observe the availability, quality and participation of Local contractors in Ethiopia now and in the future?