COLLEGE OF BUSINESS AND ECONOMICS

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DEPARTMENT OF PROJECT MANAGEMENT

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ASSESSMENT OF PROJECT MANAGEMENT MATURITY IN ELMI OLINDO PRIVATE LIMITED COMPANY

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ADDIS ABABA

ADDIS ABABA UNIVERSITY

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ASSESSMENT OF PROJECT MANAGEMENT MATURITY IN ELMI OLINDO PRIVATE LIMITED COMPANY

THESIS SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE AWARD OF MASTERS OF BUSINESS DEGREE IN PROJECT MANAGEMENT

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By: - Bedr Kemeredin Bedru

Approved by Board of Examiners

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Internal Examiner **Signature**

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External Examiner **Signature**

Statement of Declaration

I, Bedr Kemeredin, Declare That the Thesis Entitled Assessment of Project Management Maturity in Elmi Olindo Private Limited Company Is My Own Work and Has Not Been Presented for Any Degree or Master Program in This or Any Other Institution. All Sources of Materials Used for This Thesis Have Been Properly Acknowledged. It Is Offered for The Award of Degree of Master of Arts in Project Management with Guidance and Support of The Research Advisor Adane Atara (PhD)

Candidate's Name	Signature	Date

Advisor's approval

This project work has been submitted for examination with my approval as a university advisor

Advisors Name	Signature	Date

Statement of Certification

This is to certify that Bedr Kemeredin has conducted this research work on the topic entitled "Assessment of Project Management Maturity in Elmi Olindo Private Limited Company" under my supervision. This work is original in nature and it is sufficient for submission for the partial fulfillment for the award of Degree of Master of Arts in Project and Management

Adane Atara (PhD)

Signature_____

Date _____

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LIST OF ACRONYMS

CMM- Capability Maturity Model

PMMM- Project Management Process Maturity Model

OPM3 - Organizational Project Management Maturity Model

P3M3- Project, Program and Portfolio Management Maturity Model

PjM3: Project Management (in Project, Program and Portfolio Management Maturity Model)

PLC- private Limited Company PM

PM3s- project management maturity models

PMBOK -Project Management Body of Knowledge

PMI -Project Management Institute

WBS -Work Breakdown Structure

Abstract

There are no construction processes that do not incorporate project management. But the practice of effective project delivery in time, cost, and quality remains a challenge. The Construction industry's effectiveness is dictated by the level of PM knowledge built in each company. The main distinction is how well it is practiced. The fundamental purpose of this study was to assess the PM maturity level of Elmi Olindo Contractors Plc. For this purpose, eleven knowledge areas were selected from the PM body of knowledge areas and five level measurement. Several literatures were assessed to show the relationship of PM Knowledge areas, Project maturity and PM systems and processes. Questionaries and Interviews were employed that allowed the collection of quantitative and qualitative data that were analyzed in order to meet the research objectives. The target population consisted of project managers and project management team members that had decision making roles in the 5 construction projects undertaken by Elmi at the time of the assessment. The research findings showed that the project management knowledge level of the company was at level 3 but going to Level 4. This implies that the Project management processes were well established and exist at organizational level. Also, the Knowledge areas were ranked from highest to lowest. It was recommended that giving special emphasis to lower-level maturity sectors can significantly help and improve performance of projects and also providing training and mentoring to the Project managers and project management team to improve their PM knowledge and practice capacity and help them improve their PM capability which will help the company succeed Further research can be undertaken to assess the maturity of Elmi to know the success of improvement efforts that has been undertook and to devise a response plan for further improvement measures.

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1. Chapter One: Introduction

1.1 Background of the Study

The construction industry is a unique industry which evokes a necessity for paying special attention to various financial attributes and constraints varying in origin. In brief, construction project management is the process of managing construction projects. But when you're talking about managing a construction project in comparison to other types of projects, the distinction is mostly that construction is mission-based. That means that the project's organization ends with the end of the project build.

The construction sector plays important role in the economy of Ethiopia. Given the essential aspect the construction sector plays in Ethiopia, developing the performance of the industry need to be a priority action. As contractors are one of the crucial players in the sector and the builders of the end product, any advancement and improvement initiatives in the industry has to considered ways of improving the capacity and capability of the contractors.

Among the various types of the projects that are currently under implementation, building construction is one of the vital elements that has been the right hand in promoting the overall life standard of human beings (Mochamad Agung Wibowo, Rudi Waluyo,2015).

However, insufficient Project managerial capacity of contractors is one of the crucial issues of the construction sector in Ethiopia. Hence, improving the Project managerial capacity of contractor's demand be one of the precedence considerations for development of capacity of contractors in Ethiopia. As much of the jobs of contractors is controlled as a project, improving the contractors‟ project management capability can significantly contribute to the overall improvement of contractors‟ capability to deliver successful projects

While generally project management is defined as managing resources over the life cycle of a project through various tools and methodologies to control scope, cost, time, quality, etc. When working in the construction industry your outlook must be broader. It usually includes a wider variety of constraints to consider that are specific to the design and build of construction projects. Construction project management can interact with a variety of different disciplines in the lifetime of a project as well, from architecture to engineering to public works to city planning. Lack of sufficient construction project management knowledge and skills in the construction project implementation process is a key challenge.

Before project maturity can be listed as a major factor, we must first understand what it means. If the conception of maturity is applied to an organization it may refer to a state where an organization is in an ideal situation to attain its purpose. Jarosław Górecki, (2014) believed that project maturity can mean that an organization is perfectly conditioned to deal with its projects A response to the need for eliminating uncertainties and reducing risks coming from economic activity is an attempt to improve project management capabilities. For this reason, construction companies need to pay more attention to the phenomenon known as project maturity (Jarosław Górecki, 2014).

Project management maturity indicates to the continuous improvement of an organization-wide project management method, methodology, strategy, and decision-making process. The applicable level of maturity will differ for each enterprise based on its definite goals, strategies, resource capacity, scope, and demand. Maturity is acquired when it is competent of showing development such as timely project delivery, cost cutback, organizational capability, and profitability (Hailemeskel T. Hailemarkos MPhil,2019) (Crawford, J.K. (2007))

This study presumed that there is a biased and overlooked lack of knowledge towards Project management Knowledge areas among project managers and project management team involved in the construction projects that will establish a weak, confused and inefficient project management process which constitutes one of the major causes of failure in construction projects. This study focuses on construction projects undertaken by Elmi Olindo Contractors Plc.

This study was carried out in the 5 building construction projects undertaken by Elmi Olindo Contractors Plc at the time of the assessement. The projects are located in Addis Ababa.

The following table highlights the name of projects and their geographical location in Ethiopia.

Table 1 Current Projects locations and names of Elmi Olindo Contractors PLC

No	Project Name	Project Location
1	DH-1 Diplomatic Residences	Addis Ababa
2	Ethiopian Airlines Medical Buildings	Addis Ababa

3	Foreign & Commonwealth Office Staff Accommodation, British Embassy	Addis Ababa
4	Indian Embassy New Chancery and Ancillary Buildings	Addis Ababa
5	New Zealand Embassy fit out works Residences	Addis Ababa

Source: Active Construction Projects from the company data

The projects were selected based on the approval obtained and the projects timing in relation to the research undertaken. All the projects that the study addressed were at the stage of execution (implementation) during the time this study was undertaken.

1.2 Background of the Company

Elmi Olindo Contractors PLC is a General Contractor established in 1945 G.C and registered with the Ethiopian Ministry of Infrastructure. It was founded by Luigi Elmi. It is, now, owned by members of the Elmi family (Elmi Olindo, 2020)

The company carries a mission that mainly targets in offering a quality end product to be achieved through rigorous organization and monitoring of the building and sourcing processes, in close cooperation with Clients and their Technical Advisors (Elmi Olindo, 2020). Working with such a mission statement, the company has been delivering a high class &high-quality end product, within a certain timeframe to Clients. It acquired an extensive experience in the Building Sector in Ethiopia since its establishment, in Addis Ababa and different parts of Ethiopia.

Elmi Olindo Contractors PLC is strategically partnered with consultants and suppliers in Europe, Africa and Asia. Embraced with this advantage, the company has been engaged in promoting the innovative and best value for money solutions (Elmi Olindo, 2020). These took part in the overall modernization of the lives of the society.
In addition, it offers technical advices and information to business partners to achieve tailored solutions to the built environment (Elmi Olindo, 2020).

Elmi Olindo Contractors PLC has been and is engaged on the following projects:

Table 2 List of Completed and Current Projects of Elmi Olindo Contractors PLC

List of Projects	
Kidane Mehret Church, Asmara	Burkina Faso New Embassy Premises Addis Ababa
Mai Nephi Dam Spillway, Interception Channels & Water Supply	Techno Style Tower, Addis Ababa
Ambassador Hotel, Asmara	CDC Laboratory - Mekele
Bahir Dar Teachers Training Institute	CDC Laboratory – Dire Dawa
UNECA Building – Addis Ababa	CMC Real Estate Project
Ambo Phyto-Pathological Institute	Aschalew Belay Hotel Addis Ababa
Addis Ababa Residential Complex	Wro Yeshimebet Tower - Addis Ababa
Coffee Board Building - Addis Ababa	AMBO Mineral Water Factory Extension and Renovation
Naval Base Quarters, Massawa	BHG Building
Zerai Derres Hotel, Assab	International Community School (ICS)-Addis Ababa
HEWO Massawa Hospital	Turkana Buildings Apartments-Addis Ababa
Red Cross Society Hqts – Asmara	Lalibela Restoration-Lalibela
Red Cross Headquarters, Nazareth	Heineken Beer factory-Kilinto
Ethiopian Economic Association in Addis Ababa	Ethiopian Airlines New Catering Facility-Addis Ababa
SOS Kinderdorf, Mekele & B/dar projects	Emirates Airlines Central Town Office and Cargo Office- Addis Ababa
Mobil Oil Service Stations	Gondar University Hospital-Gondar
Coca-Cola bottling factory extension in Addis Ababa	Ethiopian Airlines Aviation Academy-Addis Ababa
Ministry of Finance - Addis Ababa	Ethiopian Airlines Hangar Five-Addis Ababa
SOS Village and School, Gode	Heineken Beer Bottling Plant
Adigrat Catholic Diocese School	Dashen Beer Factory-Debrbirhan

Head quarter building for the DFID in Addis Ababa	Horra Food pasta and Biscut Factory
South Africa Embassy in Addis Ababa	Indian Embassy Residence and Chancery Project -Addis Ababa
The Royal Nederland's Embassy in Addis Ababa	British Embassy FCO Accommodations-Addis Ababa
Boran Real Estate Building in Addis Ababa	BGI headquarters -Addis Ababa
GTZ's head quarter building in Addis Ababa	DH-1 Accommodations Project- Addis Ababa
The British Council Head office Addis Ababa	New Zealand Embassy Projects-Addis Ababa

Source: The Elmi Olindo Contractors PLC website, www.elmiconstruction.com

1.3 Statement of the Problem

Balancing the elements of a complex project time, money, scope and people is one of the challenges of construction management. It is reasonable to say that most companies are unclear, uncertain and even confused about the position of their current approach of Project Management.

Project management is of high significance for construction companies nowadays. This is of special interest for Elmi Olindo Plc which operate in the multi-project environment. For them, it is crucial to find out how good they are at managing projects. To that end, the project management maturity must be assessed. However, getting a picture of the organization is entirely the initial Process. The second should be to analyze the results and, based on them, undertake appropriate activities in order to increase efficiency in project management.

This assessment presumed that there is a biased and overlooked lack of knowledge towards Project management Knowledge areas among project managers and project management team involved in the construction projects that established a weak, confused and inefficient project management process which constitutes one of the major causes of failure in Elmi Olindo projects.

Poor management of the project management knowledge areas would have a huge effect on the achievement of each project as well as the success of the company because of the projects held by the company are generally capital demanding, intricate; and demand considerable

management experience, skills, tools, engagement and structure coordination of an extensive range of experts in various field.

Generally, data from the company shows that among the many challenges and problems projects are impacted by there are: time delays, cost overruns, quality matters, health and safety hazards, personnel related matters, construction materials and equipment importation delays, tools and machinery breakdowns etc. This problem not only relates to the working environment of the organizations but also mainly relates to the internal integration and management of critical PM knowledge areas.

On the other hand, the company is seen to lack the knowledge and application of scientific project management systems, tools and techniques that impact the efficiency of its operation and poses many challenges to achieving its project objectives namely the failure to meet construction contract time and work within the budget limit. Based on a close review and assessment of the project management practices adopted (company and project documents), it was observed that the company does not have a systematic and organized implementation of the project management knowledge areas.

Consequently, the procedures, processes and understanding of the project management knowledge areas in projects is totally left out to project managers and project management team which is at the mercy of their awareness, knowledge and attitude towards Project management.

Finally, no evaluation of the company on this subject was made on the basis of the information gathered from Elmi Olindo Contractors PLC, which means that the company lacks adequate information on how mature its project management knowledge areas are and how to achieve a higher level of project management maturity in terms of the knowledge area for successful project delivery because systematic and sustained improvement effort requires knowledge of where the current status of the practice is, where desired to go, and the gap between the two.

Therefore, the process of identification and assessment of the factors which may have a negative impact on the achievement of the company's business/project objectives is nonexistent.

In line with the above, this study aimed at assessing the current project management knowledge maturity level of Elmi Olindo Plc to show its areas of strengths and weaknesses in

implementing the knowledge areas based on the current practices among project managers and project team members in the current construction projects undertaken by Elmi Olindo Contractors Plc.

1.4 Research Questions

In attempting to address the issues highlighted under the statement of the problem, the following research questions were developed:

1. What is the level of each PM knowledge areas as practiced in managing the five construction projects currently undertaken by Elmi Olindo Contractors Plc among project managers and project management team members?
2. What is the overall PM knowledge maturity level of Elmi Olindo Contractors PLC in managing the five construction projects currently undertaken by Elmi Olindo Contractors Plc among project managers and project management team members?

1.5 Objectives of the Study

This study assumed that there is a probability of increasing the chance of achieving project objectives by performing the project management knowledge areas properly and also establishing the proper project management systems and practices. The study tried to show the practice of Elmi Olindo Contractors Plc in undertaking its construction activities in Ethiopia.

In view of the above, the general objective of the assessment was to assess the current construction project management maturity level of Elmi Olindo in the five currently undertaken construction projects by Elmi Olindo Contractors Plc and provide improvement recommendations works in managing the projects.

The specific objective is:

1. Assess whether and to what extent the processes and practices under each of PMBOK‟s Project Management knowledge areas are being applied a by Elmi Olindo Plc in managing their the five currently undertaken construction projects?

1.6 Significance of the Study

The findings and recommendations of this study was of high significance to the Elmi Olindo team i.e., Project owners, project managers and project management team members involved in construction projects to enhance their awareness, knowledge and understanding towards project management knowledge areas which is essential and crucial in establishing the appropriate project management practices and mechanisms which will eventually contribute for the success of construction projects.

Elmi Olindo Contractors PLC was the direct beneficiary since it had the opportunity for its current Project Management project maturity trends to be measured and be given the techniques which would yield an improved project management and a productive work scheme. This, in turn, will play its own role in expanding the company's reputation in terms of delivering its construction projects within the pre-set time frame, thus, avoiding liquidated damage and increase its profit margins up until the completion of its projects.

Furthermore, the maturity assessment result of this research can be used as initial benchmark information in prioritizing and designing improvement action in each project management knowledge areas of the company.

The study may also enlighten and inform all stakeholders involved in construction projects undertaken by Elmi Olindo Contractors Plc how matured and prepared the projects are in terms of each Project Management Knowledge areas.

Finally, it may also give a general insight to the academic & professional society about the Project management practices employed in construction projects undertaken by a grade 1 contractor like Elmi Olindo Contractors Plc and help other organizations to benchmark the study to assess their own project management knowledge maturity level and guide them in using the work assessment approach to achieve a better working condition and also encourage future engineers, contractors and even researchers to pursue further studies on project management knowledge maturity in the Ethiopian construction industry; be it at a company or national level.

1.7 Scope and Limitations of the Study

As the scope of the study focuses only on one construction company and the sample size was quite limited there is a difficulty in generalizing the findings to all contractors and professionals operating in the Ethiopian construction sector. The scope of this study was limited to the five ongoing construction projects undertaken by Elmi Olindo Contractors Plc, and did not consider past completed projects. Therefore, a more extensive study on past completed projects will bring additional detailed insights on the subject matter.

Furthermore, the study was conducted with a focus on project managers and project management team members of Elmi Olindo Contractors Plc. This study was conducted with the assumption that the ultimate responsibility of managing risks in order to achieve project objectives rests on the decision makers (i.e., project managers and project management team members). Nevertheless, project management as well as the achievement of project objectives is a shared and collective responsibility. Therefore, there is a need for a more participatory and comprehensive study in this area.

In this regard, the acknowledged limitations of the study were, the shortage of time available for the study, accessibility of the project staff was hard because of their busy schedule and lack of time to respond to the questionnaires because of not being interested or willingness to cooperate.

Finally, coronavirus restrictions were a limitation that hindered to conducting of interviews to all project managers and the also the result of the study was dependent of the project staff's knowledge and understanding of the Project management knowledge areas of the research.

1.8 Organization of the Study

This thesis contains five Chapters. These being the introductory part (Chapter one), the literature review part (Chapter two), the methodology of the assessment (Chapter three), the results (Chapter Four) and finally Discussion, Conclusions and recommendations (Chapter Five)

- Chapter one gives a general view of the subject matter at hand beginning with the provision of an introductory part plus concise definitions of the key terms. Having

identified the problem statement, it, then, shows the beneficiaries of this research together with the objectives and scope and limitations.

- Chapter two presents literature review with general description by different researchers on project management, construction management Project maturity and discusses previously done studies and points out the constraints that affect project maturity, also it presents the work assessment approach through which the project maturity is to be measured and assessed.
- Chapter three presents methodology of the assessment. First it clarifies the subject area and identifies the data sources along with how it is going to be collected. followed by the sizing of samples and method of the data entry. Finally, it gives a general picture of how the research is going to be presented.
- Chapter four is comprised of results with this section containing a description about the main findings of a research.
- Chapter five consists of discussion, recommendations, conclusions and areas for future study.

2. Chapter Two: Literature Review

2.1 Introduction

This section presents the findings from different reviewed literatures related to the concepts of projects and Construction project management, Project Maturity and Project Management Maturity Models. The theoretical literature review will contain definition of concepts/terms from theoretical perspective and also help to conform what approaches previously existing in Project management maturity, the relationships between them, to what degree the existing theories have been reviewed and related literatures on PMBOK and PM Maturity Models are discussed.

Also, this chapter consists the understanding of what constitutes a project, and provides evidence from literature on project management, including its characteristics, processes, knowledge areas, and activities. Attention is paid to the project management maturity.

I used different procedures to identify relevant literature. The search was bound to the last 10 years of recent literature. The literature search included peer-reviewed journals, articles, books, and encyclopedias from Google Scholar,

2.2 Theoretical Review

It's worth emphasizing that when we think about construction projects, we must define Project itself, construction project management and project management maturity. The theoretical assessement clearly analyzes the collection of theory that has been acquired in regard to project maturity concept, theory, phenomena. Previous studies regarding Project Management Maturity are reviewed, analyzed and compared. The concepts are discussed briefly below.

2.2.1 Project

Many authors and researches have described and defined project in distinctive ways indicating its concept. Summing up the definitions given a more complete definition therefore might be project is a temporary endeavor (that has a definitive start and finish time) that started following definitive cycle of beginning, determination, outlining, execution and closing to build an exclusive product, service, or issue through unique organization and

coordination of human, material and financial resources. [(Project Management Institute (PMI), 2004). (Muriithi& Crawford, 2003), (Stanleigh, 2007), (Abadir H. yimam 2011).

Precise perception of the definition and crucial aspect of the project is of consequential importance. Every project is not, correct way to prepare or produce something but it's an opportunity to attain some aimed outcome by carrying out a clearly systematic management approach. An individual or organization involved in projects needs to understand how to solve complexity of problems through project management.

Similarly, according to Cleland & Ireland, (2002), characterized project as definitive scope, constrained by insufficient resource, comprising of many persons with distinctive skills and, mostly continuously clarified throughout its process cycle.

2.2.2 Project Management

Project management is one of the crucial skills demanded by companies around the world. As such, it has become one of the fastest growing professions in the world. Increasingly, companies are clearly seeing the benefits to be gained from investing time, money and resources to build organizational project management expertise, such as lower costs, greater efficiencies, improved customer and stakeholder satisfaction, and greater competitive advantage (PMI, 2010). PMI research identifies the project management career as one of the fastest growing professions in the business world, noting that project managers are highly valued in virtually all sectors (PMI, 2015).

To understand why project management is vital and important, we must first need to define exactly what project management is. PMI defines project management as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

Carmichael, (2004) emphasized that the utilization and integration of modernized project management will give project managers the know-how, skills, tools and approach to the entire planning, directing coordinating, monitoring and control of all dimensions of a project from its inception to completion, and the motivation of all those involved to produce the product, service or result of the project on time, within authorized cost, and to the required quality and requirement, and to the satisfaction of participants.

2.2.3 Construction Project Management

Management of construction projects, unlike managing a single company, differs by its far-reaching coverage to coordinate and regulate all the project process critical to the successful accomplishment of the projects.

A widely misunderstood pair of concepts in the construction industry are construction management and project management. They are generally used conversely under the same definition, when in reality, there are major defining characteristics among the two. The management of construction project has some differences from the management of other projects. The differences mainly stem from the nature and characteristics of construction projects. The consideration of these differences is important for successful management of construction projects.

Sears et al., (2015) stated that construction projects embrace a variety of entities, from project initiation to completion. As the project process flows from one end to another, construction project management demands resources from financial organizations, agencies, engineers, architects, lawyers, insurances, contractors, material and equipment manufacturers, construction craft workers. Construction projects are differentiated by their uniqueness.

Generally, construction projects as characterized by (Chartered Institute of Building, 2002) are generally capital demanding, intricate; and demand considerable management experience, skills, tools, engagement and structure coordination of an extensive range of experts in various fields.
Jekale, (2004) have studied the relationship between construction projects and human resources and stated in comparison to variety of the other enterprise, construction projects comprise relatively comprehensive manpower usage, and deplete very number of materials and physical tools.

Also, according to Abadir H. yimam (2011) he stated that the end objective of the construction project management is the complete pleasure satisfaction and delight of the client's expectations and demands for a feasible project both in terms of performance, functionality on time delivery and within budget.

2.2.4 Characteristics of Construction Industry

Construction is an industry that has a great impact on the economy of all countries. Almost, it is very difficult to think of any development activity that does not involve construction. The construction industry is a complex system composed of many players that require adequate knowledge to stay competitive. Similarly, the construction projects' process needs different specialized services, complex and consumes time to meet the objectives.

The construction sector plays important role in the economy of Ethiopia. Given the essential aspect the construction sector plays in Ethiopia, developing the performance of the industry need to be a priority action. As contractors are one of the crucial players in the sector and the builders of the end product, any advancement and improvement initiatives in the industry has to considered ways of improving the capacity and capability of the contractors.

However, insufficient Project managerial capacity of contractors is one of the crucial issues of the construction sector in Ethiopia. Hence, improving the Project managerial capacity of contractor's demand be one of the precedence considerations for development of capacity of contractors in Ethiopia. As much of the jobs of contractors is controlled as a project, improving the contractors‟ project management capability can significantly contribute to the overall improvement of contractors‟ capability to deliver successful projects

The nature and characteristics of the Construction industry and construction projects in developing countries, is different from that of the developed countries in many aspects. Based on the research by Jekale (2004), the Construction industry in many developing countries is characterized by "too fragmented and compartmentalized; Public sector dominated market; considerable government interventions; considerable foreign finance (dependency for public construction), and low development of indigenous technology".

Moreover, Adams, (1997) emphasized that the construction industry in developing countries depend on imported input such as construction materials, machinery, and skilled manpower. In addition, the industry is dominated by foreign construction firms; which execute almost exclusively all the major construction works This is also the case in Ethiopia.

2.2.5 Project Management Knowledge Areas

Most projects are managed using the PM body of knowledge as a standard. It is a broad concept that covers all aspects of project management expertise. It includes proven tools and

strategies for guiding project management processes toward a successful project outcome. The body of knowledge identifies core knowledge areas of project management skills and practices that any professional must recognize and learn in order to be fully qualified in their profession.

PMI confirmed that knowledge built through time impacted the convergence of world construction industry practice. The impacts included rapid advancement in technology, application of new project management tools and techniques, modern method of construction, alternative project delivery mode, and societal influence visibly affecting the performance of projects.

According to PMI (2016), contractors, consultants, architectural, or engineering designers are seen as the core stakeholder in the construction management process. Lack of planning, poor preconstruction preparation, poor communication, and weak construction contract administration were identified as core construction problems. In order to ensure successful organization and project success, PMI advised the construction project management process established on fundamental theories and concepts following 11 PMBOK founding the construction management process. Below is the brief process of the knowledge areas.

1. Project Integration Management: Deals with processes that integrate different aspects of project management. The knowledge areas deal with improving the Project Charter document, fundamental Project Scope, and Project Management Plan. Additionally, it deals with controlling, monitoring and overseeing the project work, integrated change control, and finally closing the project.

2. Project Scope Management: Encapsulates processes that are responsible for controlling project scope. PMBOK (4th edition) defines Project Scope Management as set of processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. The PMBOK‟s project scope management process involves the processes: Identify Requirement, define scope, Create WBS (Work Breakdown Structure), Verify Scope, and Control scope. From contractors‟ perspective scope management is mainly about ensuring that all the works the contractor is doing is what originally agreed on and covered by the contract documents. According to (Sarshar, et al., 2000) “During the construction phase, (Scope management) has no specific meaning, as the

(scope) has already been defined by this phase. Thus, at this stage scope management for a contractor is mainly concerned with scope control".

3. Project Time Management: Includes processes concerning the time constraints of the project. It mainly deals with Activity definition, resource determination/estimating, sequencing, and duration determination/estimating. Additionally, it deals with schedule improvement/development, control and monitor.

4. Project Cost Management: Includes processes concerning the cost constrains of the project. Some of the processes that are part of this knowledge area are Cost Estimating, Budgeting, and Control.

5. Project Quality Management: characterizes the procedures/processes that conform that the project matches its quality requirements. It consists of Assuring quality, planning quality, and controlling quality.

6. Project Human Resources Management: Includes the processes that deal with obtaining and managing the project team. A few of the procedures/processes of this knowledge areas are Planning human resources, Acquiring Project Teams, Developing Project Team, and Managing and controlling Project Team.

7. Project Communication Management: characterizes the procedures/processes regarding communication systems of a project, namely, planning communication, reporting performance, and distribution of Information.

8. Project Risk Management: characterizes the procedure/processes regarding with project-related risk management. It consists of Risk Identification, Quantitative and Qualitative Risk Analysis, Risk Response Planning, and Risk Monitoring.

9. Project Procurement Management: consists of all procedure/processes that deal with gathering services and products required to finish a project. It includes of Planning for Contract, selecting responses from sellers, Selecting Sellers, and closing the contract.

10. Project Procurement Management: Stakeholder is an integral part of a project. People, groups or organizations that could influence or be influenced by a project or origination is considered as stakeholder. Managing these stakeholders involves several activities like other knowledge areas. The first activity is identification and prioritizing them according to their

concerns. Stakeholders need to be engaged and monitor & controlled to make sure their need are met.

11. Project Safety Management: Project Safety Management includes the processes and activities of the performing organization that determine safety policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken. PMBOK‟s project safety management includes the processes: Plan Safety, Perform Safety Assurance and Perform Safety Control.

Applying the skills, knowledge, techniques, and tools of project management are necessary, but not the only thing to affect project success. Understanding the fundamental knowledge of project management to address the challenges encountering in the project process effectively is needed for project success. PMI (2016) recommended project managers working at any organizational setting of contractor, consultant, and the client advised to have adequate knowledge, experience, and competence for the project management process.

2.2.6 Project Management Maturity

The state of project management knowledge that constituted an organization's systems and project teams, decides if the project succeeds or fails. Project management organizations with high maturity levels account for better project performance than the lower levels.

Mullaly & Thomas (Mullaly, M.E.M. & Thomas, J. 2010) pointed out that there seems to be a relationship between maturity and performance. Nieto-Rodriguez & Evrard (2004), from a construction firm indicated also that project failures are often the result of organizational aspects beyond the influence of the project manager; and they claim that a higher level of organizational maturity enhances project performance.

Crawford, (2006) emphasized that there is a need to look at an organization's "complete" picture of Project Management effectiveness and therefore assessment frameworks have developed to become progressively predominant, in particular, the improvement and utilization of Project Management.

Furthermore, Sarshar, et al., (2000). emphasized the relationship between a mature and non-mature company and stated that in a very matured company, an efficient procedure/process is continuously followed as a result of all of the involved participants comprehend the benefit of

doing so, and the necessary infrastructure exists to support the process and in a not fully grown company in contrary is a company that doesn't include or apply persistent and detailed procedures/processes in the management of its projects

"An organization that is immature in project management may occasionally deliver individual (projects) that produce excellent results. However, in such cases managers are more likely to be working reactively, focusing on solving immediate issues, rather than proactively acting. In addition, schedules and budgets are likely to be exceeded and if deadlines are imposed, the quality of deliverables is likely to be compromised in order to meet the schedule. In a not fully grown company, repeatable procedures/processes and outcomes depend exclusively on the availability of definitive personnel with a justified track record." (Office of Government Commerce (OGC)).

Also, according to Chrissis, Konrad, & Shrum, (2003), a matured process is well understood throughout a mature organization; usually through training and documentation, and the procedure is continuously being controlled, monitored and developed by its end users. The capacity of a grown process is known.

Reaching project maturity would not undoubtably assure that a project would be successful. Nonetheless, it could develop a project's odds of attaining success. It should be noted that the processes of attaining maturity is not a one-time event that is accomplished by declaring a methodology and structure, nor it is a quick fix for immediate tactical problems rather, it is a consciously planned and properly managed continuous improvement effort [(Supic, 2005), (Kaya & Iyigun, 2001), (Saiedia & Kuzara, 1995) (Abadir H. yimam 2011).

According to (Chartered Institute of Building, 2002), the major task of project management in construction is primarily to coordinate professionals in the project team to enable them to make their best possible contribution to the project efficiently. In addition to knowledge of project management and general Management, managing construction projects requires an understanding of the design and construction process (Hendrickson). The capability to correspond, communicate and the capability to conduct, manage team are also very crucial for rewarding, successful handling and management of construction projects (Chen, Partington, & Qiang, 2009).

Hendrickson summarized the objectives of project maturity management in construction as:

1. Determining and establishing project goals and objectives consisting of determining, defining the scope, developing the budget and schedule, setting achievement, performance demands, and choosing project participants.

2. Development of economical resource application, utilization through acquisition, and procurement of manpower, services equipment and materials according to the recommended budget, schedule and plan.

3. Application of different types of procedures through appropriate organization and monitor of degerming, outlining, designing, monitoring, controlling, estimating, contracting and construction in the overall process.

4. Development of efficient communications, procedures and mechanism for working out conflicts between the different participants involved.

2.2.6.1 Project Management Maturity Models

Project Management Maturity models are just one such means that organizations can use in their pursuit of improving their Project Management capability. [(Cooke-Davies, 2005), (Cleland & Ireland, 2002), (Skulmoski, 2001)]. Abdul Rasid et al., (2014) stated that the project management maturity model presents organizational management efficiency, state of project delivery practice, and provides information about further performance development

According to (Cooke-Davies, 2005), the practice of maturity models equips a frame work for purposeful and continuous improvement of project management capacity of repeatedly delivering successful projects. Generally, maturity models help an organization know how mature its project management practice is; that is, it helps the organization measure the degree to which it is executing Project management against the practice of its peers in the industry in general or best practice in the industry (Man, 2007). Furthermore, maturity models aid in the frame development attempt by planning and identifying crucial area and recommending development subjects.

Pennypacker (2001) also emphasized that the purpose of a project management maturity model is to provide a model of progressive improvement in project management systems and

processes that can be used to assess an organization's capabilities and to provide an improvement path.

However, Crawford, (2006) strictly stated that only to make distinctions is not sufficient, any project management maturity model preferred to measure Project management maturity should lead out a consistent path for continuous improvement. In addition, each company has to review at its own results assess and find out where the company has a considerable deal to achieve in increased project management maturity. It is essential that the appraisal itself to be repeatable, contribute consistent measurements, outcomes and results, and provide for any degree of benchmarking with other companies. This gives the base for any appraisal to be applied as a "checkup" tool to estimate progress and to plan the next rational steps forward (Crawford, 2006) and thus support companies to view Project management as a strategic enabler (Mullaly, 2006).

Generally, there are a vast number of project management maturity models that have been developed. The majority of maturity models have adapted the CMM"s five levels of maturity stage beginning from lower level of maturity, initial (Level 1), to the highest level of maturity, continuous improvement(level-5). The majority of these PMMMs consist of five distinct levels: level 1 is the initial level where no established project management practices exist; and level 5 is the 'optimizing' level where the company is fully mature. Figure 1 describes the five maturity levels.

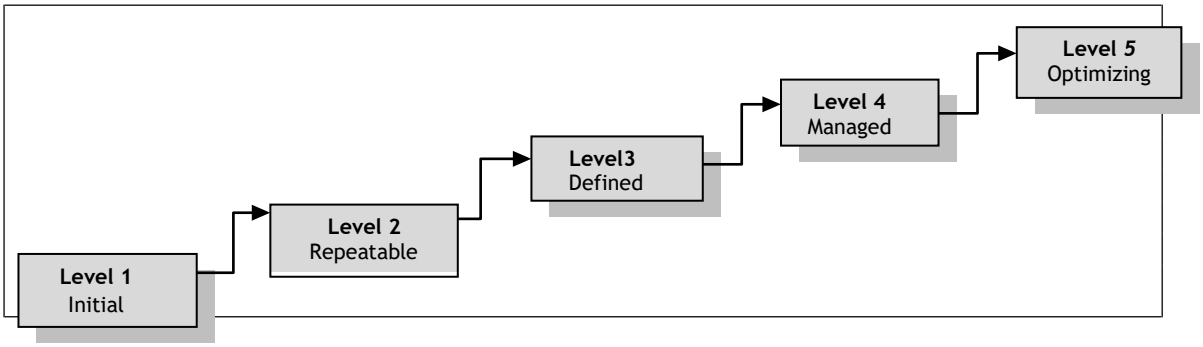

Figure 1 Project Management Maturity Model

The prevailing assumption is that companies with above average maturity levels are likely to be successful in terms of project capability, efficiency and effectiveness and further have a competitive recognition in the construction marketplace (Cooke-Davies & Arzymanow,

2003). For instance, a Project management model can be used to determine present capacity and determine development objectives for companies intending to develop the efficiency effectiveness and capability of their Project Management, in order to hand over projects on time and within budget successfully in long term (Hillson, 2003; Mittermaier & Steyn, 2009). Most of the models developed also demonstrate that the application of a project management is very crucial to project demanding companies to develop more dynamic, efficient productive and effective.

Abadir H. yimam, (2011) in his research emphasized that Project maturity appraisal should be executed to aid the work not for its own advantage. Generally, to derive the benefits of maturity, organizations should: exert continuous and consistent effort, have strong executive management support for the process, emphasis on project management best practices, set reasonable goals, implement changes step by step, conduct project management training, create opportunity for sharing knowledge across the organization and always target incremental improvement.

Most of these models have similarities in their structure and content, inspired by the Capability Maturity Model (CMM) created by the Software Engineering Institute of Carnegie-Mellon University between 1986 and 1993 (Cooke-Davies &Arzymanow, 2003). Almost all of the models are established on the conception that companies progress through a sequence of five stages to maturity: basic/initial level, repetition level, defined/described level, managed/controlled level and optimizing/developing level. These five levels describe an ordinal system for calculating and measuring the project maturity of a company's procedures and process and for assessing and monitoring its process capacity. The five levels further help the organization arrange and prioritize its development attempts (Cooke-Davies &Arzymanow, 2003).

Level-1 The Initial Process

Mullaly and Thomas (2010) described Level-1 as ad hoc, meaning the level is associated with an informal and inconsistent approach to project management. The formal process of project management is absent and neglected. This level was characterized by a rare project management knowledge available at an individual level and no clear direction of project knowledge management. The level was also characterized by the absence of structured, organized project management. Instead, the project outcome is the effort of individual's

expertise effort. Villa (2010) put maturity Level-1 just as “unknown.” He described that knowledge is the unknown dimension of projects. At this level, the project management teams were unaware of the meaning and importance of project management knowledge for project success.

Level -2 Structured Process and Standards

Mullaly and Thomas (2010) gave clear distinction to Level-2 as stages where organizations experience some degree of incomplete project management practices. This practice is not consistently implemented across the organization or, however, efforts to form some level of organizational formality, not comprehensively applied. Villa (2010) put Level-2 as a new phase where the project management team became aware of the importance of knowledge of project value. Companies at level two implement basic project management practices, but only on an individual project level. This means there is no broad approach regarding PM success, which is likely to depend on key individuals in the organization.

Level-3 Organizational Standards and Institutionalized Process

Level-3 is ensured when organizations reached to stage of consistent implementation of project management. A complete project management process in place is one indicator of the organization's maturity Level-3 (Mullaly & Thomas, 2010). The aspiration of many organizations to attain this level. Villa (2010) described this phase as “intended” meaning because the project management team recognized the importance of knowledge for effective project delivery and project management development.
At this level, the organization is prepared to face a crisis as it has the necessary documented procedures that was guide both management and employees towards the steps to take. Furthermore, an organization at this level is interested in creating documentation that helps define the relationship between management and employees (and vice versa) and between the organization and customers.

On this level, we are getting into the various company system, with properly characterized process that are observed as the common and accepted way of performing things. The organization is well-coordinated, and also the project management is concerned in carrying out supporting prompting and implementing the use of these processes.

Level-4 Managed Process

This level is attained when an organization experience visible cross-fertilization of project management knowledge gained (Mullaly & Thomas, 2010). The level is the result of Integrated practices. When organizations reached this level of maturity, project management becomes the integral management capabilities fully manifested in the project management process.
Level 4 introduces metrics that are used to assess the current level of productivity based on the project management procedures and standards that are in effect. This way, the management can know, at any time, if a project is destined for success or if there are problems that need to be addressed.

Villa (2010) called this level as shared. In maturity Level-4, there is a culmination of knowledge recognized in the entire organization as a CSFs of project success. The value of knowledge management well recognized. Stakeholders and project owners support the knowledge management process.

Level-5 Optimizing Process

Maturity Level-5 explains a holistic and fully integrated way of managing knowledge capability (Mullaly & Thomas,2010). This maturity level embraces project practices open for continual improvement. Villa (2010) stated that Level-5 as endless, meaning organizational project management practices move in paths of continual growth and development.

On this level, we are getting into the various company system, with properly characterized process that are observed as the common and accepted way of performing things. The organization is well-coordinated, and also the project management is concerned in carrying out supporting prompting and implementing the use of these processes.

At this level, the organization is prepared to face a crisis as it has the necessary documented procedures that was guide both management and employees towards the steps to take. Furthermore, an organization at level three is interested in creating documentation that helps define the relationship between management and employees (and vice versa) and between the organization and customers.

Continuous improvement remains the core strategic direction of organizations. Level-5 encompasses knowledge present at individual, group, organization, inter-organizational levels, and project management knowledge follows a pervasive direction Finally, at the top level, the focus is set on optimization. Among all the proper processes and procedures applicable and available at a company's level, the management is involved in progressively developing the project management achievements based on their specific experience. Level five also speaks about an opening towards innovative techniques not used by other organizations that could bring a competitive edge.

2.3 Empirical Review

This part of literature review will discuss related articles and journals to the topic under Study. According to Yimam (2011), on average, Grade 1 contractors in Ethiopia practice a more traditional way that they do not have formal way of performing the PM knowledge areas. Furthermore, the study discovered that nearly half of the contractors do not carry out the required project management processes.

The assessment of project management capability: A case study on Mesfin Industrial engineering was conducted, Temesgen Tewelde in 2013. The aim of the study was to develop an understanding of what project management maturity is and assess the current level of maturity of the company using PM solution project management maturity Model. A case study was the research design used by the author. According to 'five level maturity' the result of the assessment suggests that the company was operating at a performance level of 2 and below. This represents that some project management processes were defined but not consistently applied to all projects. It also shows that maturity level 2 was not achieved by all the project management knowledge areas and best practices. The assessment tool also identifies areas to be emphasized for significant improvements. The result also suggests the need to work more on these lower maturity levels before stepping up to next maturity level.

Also, Project management maturity assessment was conducted by Girma (2015), in Landsvirkjun-power projects department division. The case study was conducted using PM solutions maturity model. Criteria of five maturity levels were used to capture the practice of each knowledge area. A mixed data analysis was conducted and the result showed most PMBOK were applied to all projects and the knowledge areas achieved organizational standard and processes. Furthermore, this indicates that most organizational standards and

processes were achieved by most of project management knowledge areas and applied to all projects. However, in some cases, knowledge areas were not completely standardized and thus processes not applied properly and ineffectively. The assessment tool also identifies areas to be focused for improvement and recommended that formal training be provided based on project management knowledge areas including organizational standards and processes of project management for the project team and others.

In the assessment conducted by Abdul et al. (2014) of Assessing adoption of project management knowledge areas and maturity level: Case study of a public agency in Malaysia he employed the criteria of the project management body of knowledge: project integration management, scope management, time management, quality management, human resource management, communication management, risk management, and procurement management to assess one Malaysian public agency project management maturity. The agency was responsible for the construction of road and building projects. Abdul et al. defined project management maturity level as measures the perceived project management knowledge practiced by project managers reflected in an organizational setting. Abdul et al. further showed that a descriptive study revealed that the agency project management maturity stage is rated at Level 2. Knowing the project management maturity level at the organization level defines what actions are needed to attain the next phase of maturity level. Abdul et al. studied the project manager's knowledge of PM, the practice of the nine knowledge areas in managing projects, and the level of project management maturity.

Also, in the assessment conducted by Ibbs and Kwak (2000) of Assessing project management maturity they suggested that a statistical methodology was developed for the project management maturity assessment of the organization. Assessing project management maturity benefits organizations and helps them to understand their strengths and weaknesses and identify their position compared with other similar organizations. It helps to test the correlation between the organization's project management maturity level and performance (Ibbs & Kwak, 2000). Ibbs and Kwak used the eight-project management body of knowledge scope, time, cost, quality, human resources, communication, risk, and procurement as criteria and six phases of project initiating, planning, executing, controlling, closing, and project organization is driven project environment to assesses the maturity level.

2.4 Summary of Literature Review

In this chapter, relevant literature to this study was examined and reviewed. I reviewed the literatures about project, project management, construction management, project management knowledge areas and project management maturity and models and relationship between project management body of knowledge and maturity level, and project success. To address the research questions, relevant variables are identified for both dependent and independent variables applying the project maturity model, project management body of Knowledge framework, and other academic writers in fields of construction project management field.

Generally, this study aimed at assessing project management maturity using eleven project management body of knowledge and five process maturity levels. in construction projects undertaken by Elmi Olindo Contractors Plc, in the hopes that the findings and recommendations could close the gap and contribute to the very limited literature in the area for the company. The next chapter deals with the methodology of data collection and analysis of these variables.

2.5 Conceptual Framework

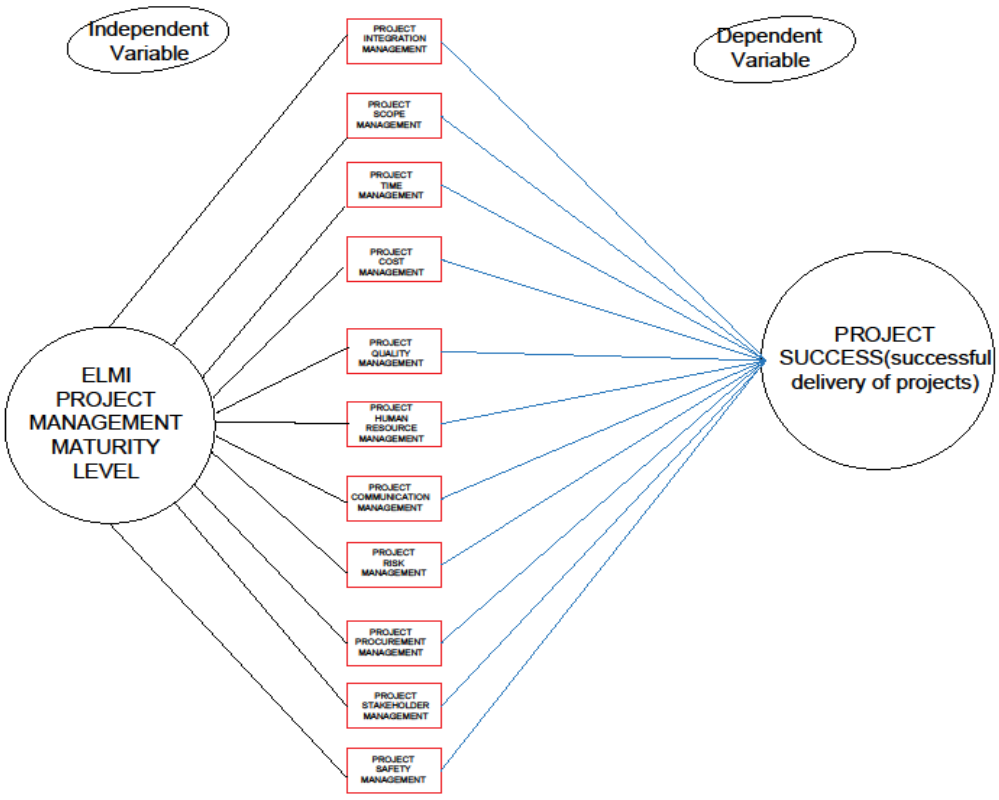

Figure 2 Conceptual Framework adopted from Project Management knowledge areas

3. Chapter Three: Methodology of the Assessment

3.1 Introduction

This chapter clarifies the overall plan, sampling techniques for data collection, the approach and the research design, and methodology followed in the entire research design. The instrument validity and reliability, methods and procedures of data collection and analysis of quantitative analysis applied, and the ethical issues to ensure the participant's rights are discussed.

3.2 Research Design and Approach

This study takes on a descriptive approach in assessing the project management maturity construction projects undertaken by Elmi Olindo Contractors Plc. Descriptive research design is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way. Descriptive design was used because it tries to describe the current status of PM practice in the Elmi Olindo Contractors.

Consequently, this study follows the mixed approach (i.e., a combination of qualitative and quantitative approaches) to assess project management maturity in the construction projects undertaken by Elmi Olindo Contractors Plc. The survey strategy employed in the study allows collecting quantitative and qualitative data which was analyzed in order to gain an insight regarding the assessment area.

To conduct this research, it was chosen to use expert judgement gathered through a survey of construction Industry professionals. The participants were mostly professionals and experts in project management working in the Elmi Olindo construction contracting organizations.

The data found from the questionnaires were analyzed quantitatively through five-levels of maturity and scoring mean to assess project management maturity of the company in managing projects in eleven knowledge areas. The data collected through interview was analyzed qualitatively to describe the current project management practice of the company.

3.3 Target Population

The target population of this study consists of project managers and project management team members who are the decision makers and are responsible for managing construction

projects undertaken by Elmi Olindo Contractors Plc. As per the data obtained from the human resources department of the company the number of members in the project management team (including the project manager) assigned to a specific project is based on the size and complexity of the project as well as the client requirements. The scope of the population of study covered the city of Addis Ababa construction industry.

At the time of the study, the total number of project managers and project management team members that were involved in managing 5 projects in Addis Ababa, were 20 which formed the size of target population of this study. Out of those 15 only responded to the questionnaires.

Table 3 Profile of Projects and Number of Respondents

No	Project Name	Project location	No of respondents
1	Foreign & Commonwealth Office Staff Accommodation, British Embassy	Addis Ababa	2
2	Ethiopian Airlines Medical Clinic Works	Addis Ababa	3
3	Indian Embassy New Chancery and Ancillary Buildings	Addis Ababa	2
4	DH-1 Residences Accommodations	Addis Ababa	6
5	New Zealand Embassy Fit-out works	Addis Ababa	2

Source: *Active construction projects from company data (2021)*

Therefore, across all the 5 projects, the total population of the study was 15. In order to meet the objectives of the study and answer research questions, it was found to be essential to consider all 15 respondents that have a decision-making role in construction projects undertaken by Elmi Olindo Contractors Plc and were responsible for achieving project objectives. Furthermore, it was found to be appropriate to consider all those individuals that potentially possessed the desired knowledge on the study's subject matter and those that had a significant role and responsibilities in their respective project management process. As such,

all 15 respondents, who were able to offer insights from which an understanding could have been built, were considered from the 5 projects.

3.4 Sampling and Sampling design

The sampling approaches chosen for this assessment was deliberate samplings. This was chosen to select individuals to participate in research on the basis of a specific plan, rather than randomly that have a direct involvement in the project management practice.

Consequently, the criteria for assessment used to select respondents for collection of data were:

_ Each respondent has to have a personal experience of project management and active on most of projects takes place on their respective department

_ Each respondent must have experience of project management practices for their respective department of company.

By using the above-mentioned characteristics 15 respondents were selected as a sample for collecting data using questionnaires and 4 respondents for the interview from their respective departments within company as listed below

_ Most of the respondents involved were project managers on site and office

-The other respondents were from site and office engineers.

3.5 Data type and source

Data for the study was collected using both primary and secondary sources. The primary data was obtained through design of questionnaires and interviews directed to a pool of project managers and project team members that had decision making roles and were responsible for managing construction projects undertaken by Elmi Olindo Contractors Plc at the time of the assessment. The secondary data was sourced from the published and unpublished sources such as credible web pages, thesis, journals, books and different published journal articles. The secondary data was used to get an insight of the problem and was considered for content validation of findings obtained from primary data.

3.6 Data Collection Methods and design

Self-administered Questionnaires were used as the major instrument and significant tool to undertake the research because, since each respondent was asked to respond to the same set of questions, it provides an efficient way of collecting responses from a sample prior to quantitative analysis and it was also one of the tools to be used to compile the full breadth of information dealing with the subject organization that is demanded to finish the maturity assessment.

The questionnaire was adapted from earlier researches and studies undertaken by Abadir H yimam 2011; it was designed to answer the questions of the study, meet the study 's objectives and it was distributed to a sample of selected respondents across all the active projects undertaken by Elmi at the time of the study. Furthermore, interview questions were undertaken on 4 respondents. The interviews were conducted in order to fill the gap in the responses received from the questionnaires.

The questionnaire surveys were sent through e-mail to selected participants of the study. A follow-up reminder was sent to each participant to get the survey back on time. The reason why I chose to collect data through internet is cost, no paperwork, time, and quality for using the Internet as data collection tool and mainly coronavirus restrictions.

The research questionnaire was delivered to 20 project managers (Engineers) of which 9 were project managers, 11 were Site and Office Engineers.15 of the 20 the participants have returned the questionnaire Hence, only response from the 15 participants was used in performing the maturity analysis.

The questionnaire was divided into two parts. The first part consists of questions of personal nature to help position the respondent's profile. The second part consists of questions with a five-level maturity rating scale regarding the organizational utilization of project knowledge management standards designed to pinpoint the maturity level of project knowledge management practices in the company in each knowledge areas. In addition, the interview questions consisted of questions regarding the organizational utilization each knowledge areas. All information was also gathered on the level of maturity as well as the level of success within the contracting organizations with respect to project completion time, cost and results.

3.7 Data Analysis

In this assessment, there was be two types of data; i.e., one being the data obtained from the questionnaires which was analyzed using quantitative descriptive statistics such as percentage, tables and charts with the help of MS Excel through a model consisting of five stages where each level has distinctive characteristics and the other being the data collected from the interviews that was analyzed qualitatively in in pursuing to describe the project knowledge management maturity and practices in each project management knowledge. The method of data entry and analysis of the studies, however, had their own unique procedures.

Furthermore, the project management maturity level was measured based on project management model on a five-level measurement. The score is measured by taking an overall average of each question from each Knowledge area. The response choices to assess the project management body of knowledge are coded as Level 1, Level 2, Level 3, Level 4, and Level 5. The lowest score implies the project management knowledge level is at a low level, and the highest score implies the organization has the highest project management knowledge leading to the success of projects at the organization level.

Additionally, the findings were presented in the form of charts using of tables and graphs based on their type and suitability for the presentation. The data acquired from the questionnaires was entered, edited and cleaned for inconsistencies, missing values, outliers and analyzed.

3.8 Validity

Validity refers to the degree to which results obtained from the analysis of the data actually represents the phenomena under study. Validity is a matter of degree and not a specific value. In order to check instrument validity, a pilot study was conducted to refine the methodology and test instrument such as a questionnaire before administering the final phase.

Questionnaires were tested on 3 respondents to make the data collection instruments objective, relevant, suitable to the problem and reliable as recommended by John Adams *et al.* (2007:136). Issues that were raised by respondents were corrected and questionnaires were refined. Besides, proper detection and approval by the research advisor was helpful to ensure validity of the instruments. Finally, the improved version of the questionnaires was printed, duplicated and dispatched. Expert opinions and literature search was first analyzed and then

used to establish content validity. Triangulation of quantitative and qualitative analysis was made to ensure the consistency of findings corresponding to each research question.

In order to check and establish the validity and to increase the accuracy of this research the used research instruments, questionnaires were collected and analyzed with utmost accuracy. To measure the validity of results, we consider the theory and the measuring instrument used.

3.9 Reliability

Reliability involves the degree to which a measurement of an aspect produces stable and steady result (Carmines and Zeller, 1979). Reliability in addition is related with repetition. For instance, a scale or test is thought to be accurate/reliable if repetition measurement made by it under steady conditions was attain the same outcome (Moser and Kalton, 1989).

The study measured the internal consistency of cross-sectional data collection instrument, i.e., questionnaire, using Cronbach alpha coefficient. The Cronbach alpha coefficient, which is based on the average correlation among items, was calculated for the 11 knowledge areas using excel and the result is presented in the following table:

Table 4 Cronbach alpha values for reliability

Main Constructs	Cronbach Alpha	**Remarks as per Nunally, 1978; Sreiner and Norman, 2008**
Project Integration Management	0.878	Excellent
Project Scope Management	0.743	Acceptable
Project Time Management	0.867	Excellent
Project Cost Management	0.677	Acceptable
Project Quality Management	0.756	Excellent
Project Human Resource Management	0.768	Excellent
Project Communication Management	0.762	Excellent
Project Risk Management	0.710	Acceptable

Project Procurement Management	0.752	Excellent
Project Stakeholder Management	0.689	Acceptable
Project Safety Management	0.702	Acceptable

Table 5: Cronbach alpha values for main constructs

The higher the alpha is, the more reliable the test is. A reliability coefficient alpha is excellent if alpha is larger than 0.75; acceptable if alpha is between 0.40 and 0.74 and poor if alpha is less than 0.4 (Nunally, 1978; Sreiner and Norman, 2008). Accordingly, the Cronbach alpha coefficient of 0.711 and 0.743 shown in the above table indicate acceptable internal consistency of the items in the two main constructs, while the Cronbach alpha coefficient of 0.760 indicates excellent internal consistency of the items in one main construct.

3.10 Ethical Issues

Assumptions are the enablers to carry out a proposed study (Simon & Goes, 2013). The first assumption in this study is honest, and accurate responses were expected from each participant. Each participant in the study was assured that their response kept secure and confidential to increase the likelihood of meeting an honest and factual response. The assumptions of honesty and trust during data collection from participants are among the expectations of the study.

Respondents carefully examined and completed the questioner responsibly. In conducting this study, the privacy of participants was kept, and it was made known to every participant that the nature of participation was voluntary and they had the right to withdraw at any time. The confidentiality of data and the participants' anonymity confidentiality of personal information, and data protection was maintained. In all cases, names were kept confidential thus collective names like respondents‖ or study participants‖ were used.

Researcher information will be kept confidential and not shared outside the research. In addition, all sources cited in this study have been appropriately acknowledged.

4. Chapter Four: Results

4.1 Introduction

The purpose of this quantitative study was to examine the construction project management knowledge maturity level as determined by the survey responses from a sample of project managers and project management teams engaged in active project sites in the Elmi Olindo Contractors.

The results below are devised in two parts in line with the objectives of this research and also the sections of the questionnaire. The divisions can help tackle one objective at a time. The first part tries to analyze the response rate and the profile of the respondents by gender, education level, job title and experience. The second part tries to present the findings of the questions asked to test the project knowledge maturity level of project managers and project management team members who have decision making roles in the projects undertaken by Elmi Olindo Contractors Plc.

Furthermore, this chapter deals with the analysis, presentation and interpretation of primary data which was collected from respondents through questioner on each project management knowledge areas from fifteen respondents and also use the data from the interviews. Background of the respondents is also discussed. Maturity level of each knowledge area is computed. Accordingly, the characteristics of each knowledge area with respect to the maturity level are analyzed.

Generally, this part presents the result obtained from semi structured questionnaire and interviews. The discussion is presented by using tables and graphs. The maturity level of each knowledge areas within the project department of the company estimated based on the mean value of each sub elements of the knowledge areas. On the questionnaire each respondent were asked to choose where their department stands in five maturity levels regard to sub elements of each project management knowledge areas. The maturity assessment has been performed for the 11 construction PM knowledge areas covered by the research. Then the mean of the five maturity levels scored by the respondents on each sub elements of knowledge areas was used to decide the maturity level of each knowledge areas, on the same time the mean of eleven knowledge areas were used to define maturity levels of the company on project management as it shows on the table below.

4.2 General Profile of Respondents

The following table shows the gender profile of the respondents:

Table 5 Gender profile of respondents

Gender	Number of respondents	Percentage%
Male	13	86.67
Female	2	13.33
Total	15	100

It can be observed that close to 87% of the respondents are male and only 13% of the respondents are female. This clearly justifies the remark by Nuanthip and Tanit (2012) that the construction industry is associated with male domination, characterized by physical strength, adaptation to harsh outdoor working conditions and abusive language. Furthermore, the table also shows that the decision-making roles in projects (project manager and project management team members) undertaken by Elmi Olindo contractors Plc is dominated by males.

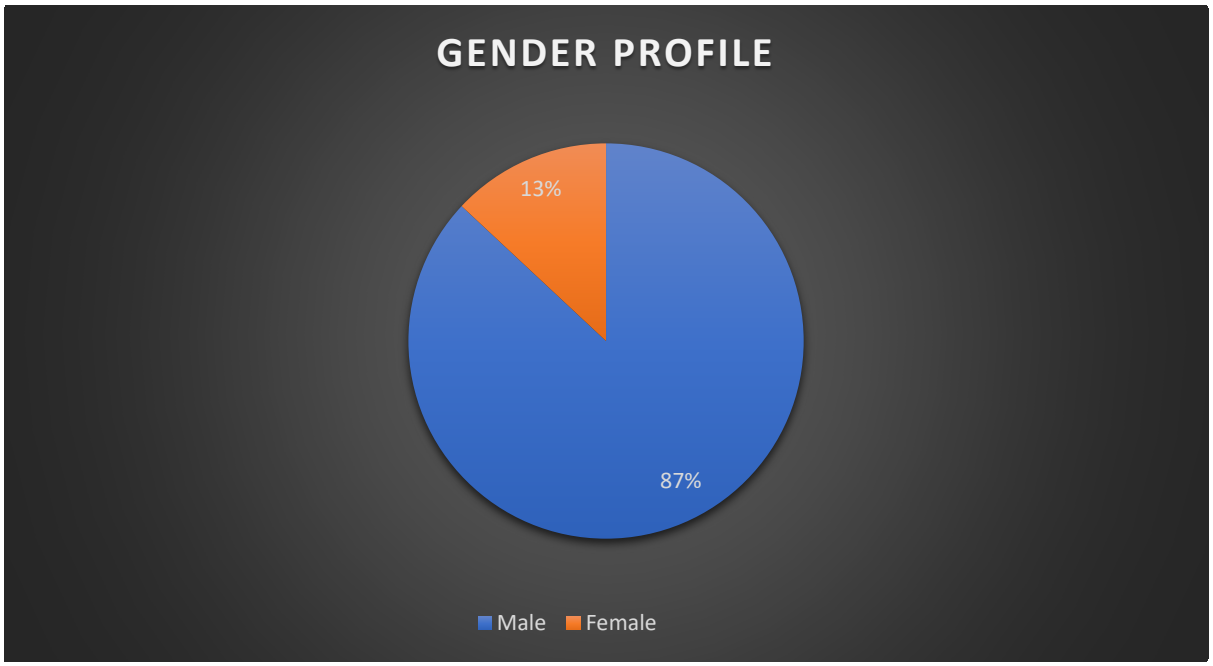

Figure 3 General profile of respondents

With regards to education levels: 93% of the respondents have Bsc/BA degrees and 7% of the respondents have MSc/MA/MBA degrees.

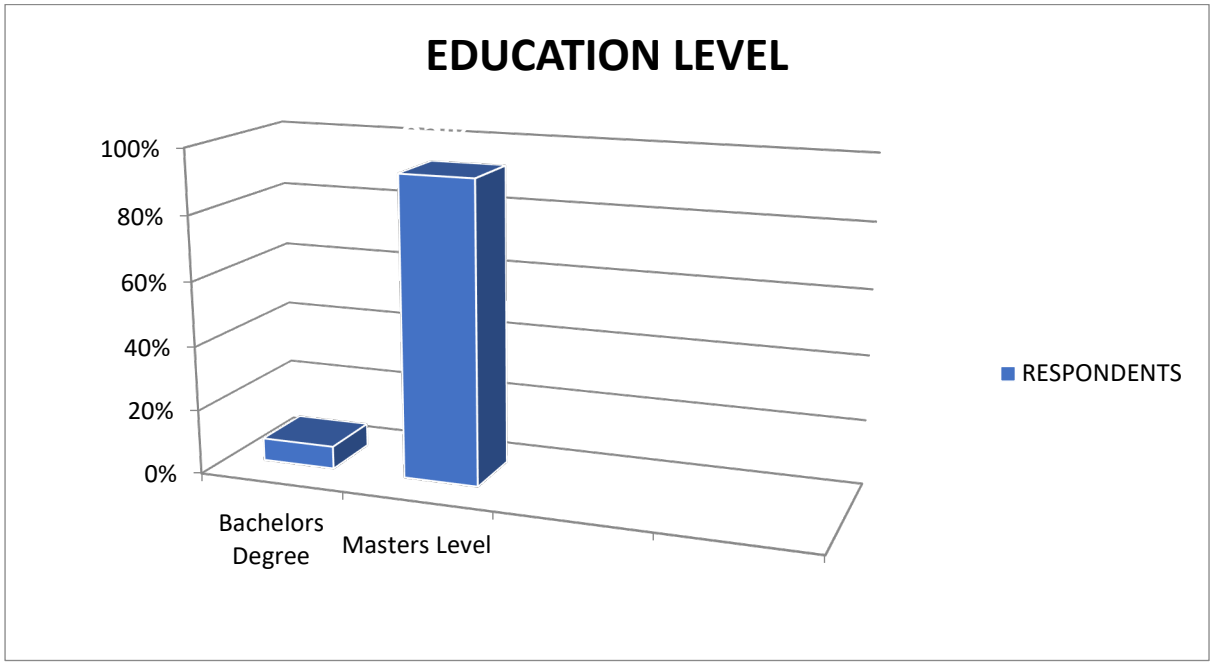

Figure 4 Education level of respondents

When we analyze the job titles of the respondents: 20% of the respondents were senior project managers, 20% of the respondents were project managers, 20% of the respondents were assistant project managers and 40% of the respondents were predominantly site engineer and office engineer title.

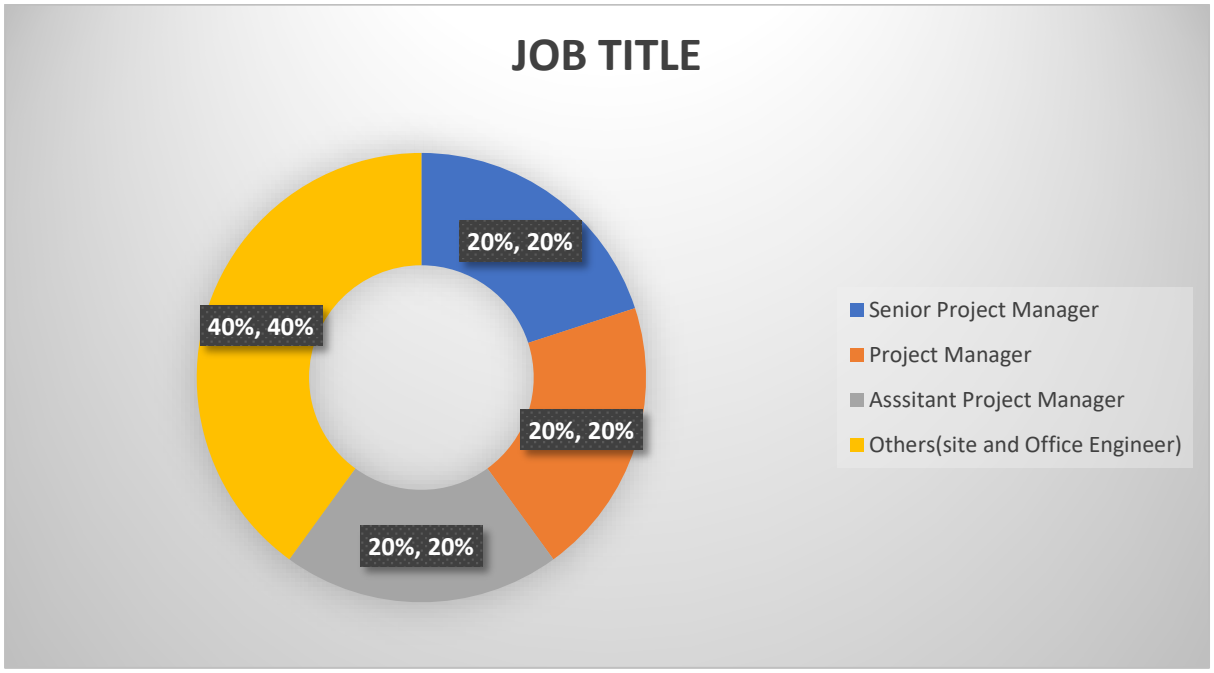

Figure 5 Job Title of Respondents

The table below gives a highlight of the experience of the respondents in the construction industry as well as at Elmi Olindo Contractors Plc:

Table 6 Cross tabulation of experience by number of years

Type of Experience	No of participants in the category	Years			
		<1	1-5	6-10	>10
Experience in industry	15	2	8	4	1
Percentage		13	53	26	8
Experience at Elmi Olindo Contractors PLC	15	2	8	4	1
Percentage		13	53	26	8

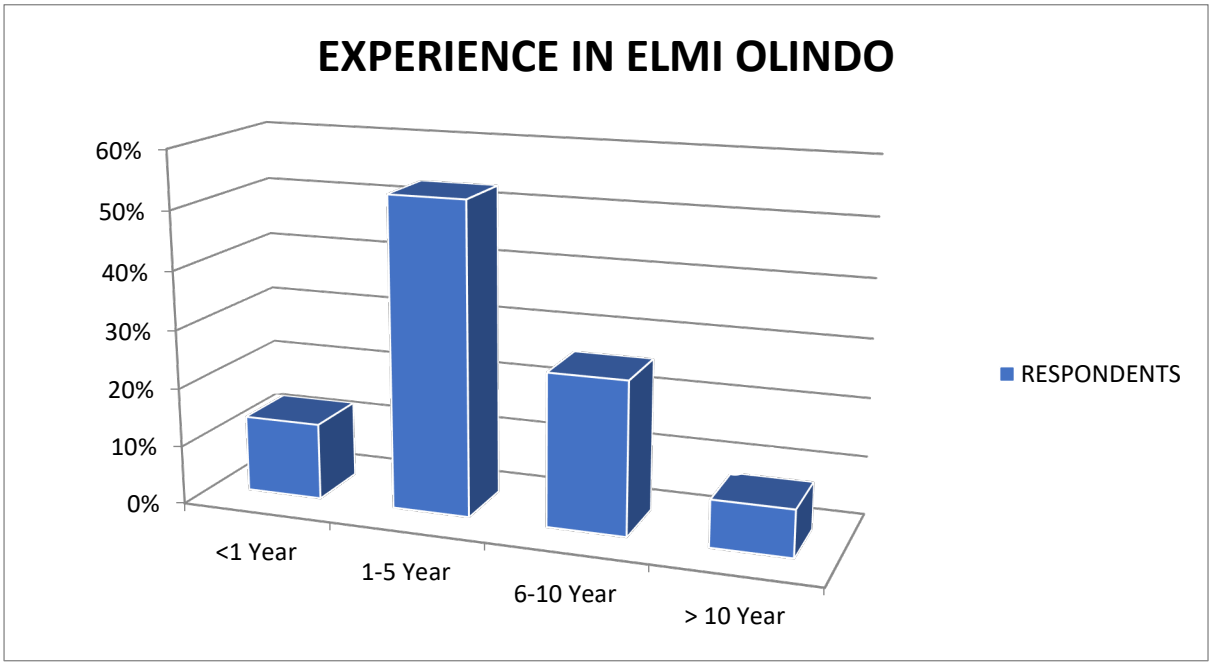

Figure 6 Experience in Elmi Olindo

4.3 Response Rate

The response rate was considered sufficient for the purpose of the study. According to Mugenda and Mugenda (2003), a 50% response rate is adequate, 60% good and above 70% rated very well. The study targeted a population of 36 respondents. All the 36 respondents completed the questionnaires and returned to the researcher but 3 of the questionnaires had missing data and therefore were not considered in the analysis. Consequently, the sample size has been effectively reduced from 36 to 33. Therefore, the response rate is found to be 91.67% which according to Mugenda and Mugenda (2003) is rated ―very well‖. Furthermore 4 respondents were successfully interviewed by the researcher in order to fill the gaps in the analysis of the findings from the questionnaires.

4.4 Data Presentation

4.4.1 Overall Mean and Rank of PM Knowledge area Maturity

Table 7 Summary on overall maturity assessment of each knowledge area

No	Project Management Knowledge Areas	Mean Maturity Level	Rank
1	Project Scope Management	**3.32**	**1**
2	Project Time Management	**3.31**	**2**
3	Project Quality Management	**3.31**	**3**
4	Project Procurement Management	**3.29**	**4**
5	Project Cost Management	**3.24**	**5**
7	Project Communication Management	**3.18**	**6**
6	Project Stakeholder Management	**3.17**	**7**

8	Project Integration Management	**3.17**	**8**
9	Project Safety Management	**3.16**	**9**
10	Project Human Resource Management	**3.03**	**10**
11	Project Risk Management	**2.77**	**11**
Overall Mean maturity of Elmi Olindo		**3.18**	

The assessment result can be seen on the above table, and shows that the overall mean of knowledge maturity level of project management practices within the project management areas in Elmi Olindo Contractors is 3.18, which is level 3. At this level project management is integrated with other business processes. Senior management recognizes PM as a success factor. Standard process of PM exists. There is also formal documentation of PM. Integration management, as described in PM body of knowledge guide, is all about unification, consolidation, communication and interrelationship of PM processes.

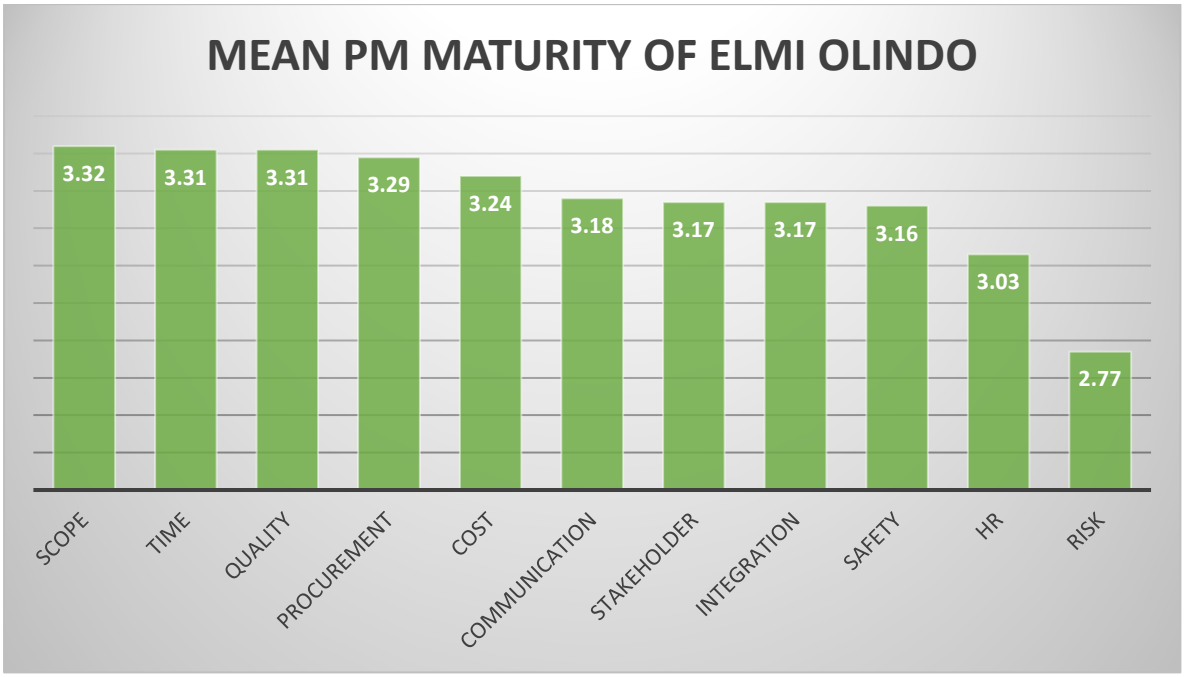

Figure 7 Overall Mean of PM Maturity

Also, as can be seen from the table the ranking of the knowledge areas of Scope, procurement, cost, time, and quality management have shown comparatively higher level of maturity compared with other PM knowledge areas. These knowledge areas are more or less being performed formally by the majorities of the Project managers. Whereas the knowledge

areas of Stakeholder, integration, safety and communication management are comparatively at lower level and could be considered to be performed informally by the majorities of the project managers. The remaining two knowledge areas of risk and human resource management are the least matured knowledge areas. For practical purpose one can consider these two to be totally unknown or practiced by very few in the industry.

4.4.2 Project integration management Maturity Analysis

Table 8 Integration Management Process

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Project management plans are developed	1	3	6	3	2	15	3.13
2	Project charter is developed	3	5	3	4		15	2.53
3	Project knowledge is managed	1	2	8	3	1	15	3.07
4	Project work is monitored and controlled		3	6	5	1	15	3.27
5	Project work is managed and directed		3	2	9	2	15	3.87
Mean Integration Management Maturity Level								3.17

Project integration management is the planning of all phases of a project. This consists of organizing tasks, coordinating resources, communication with stakeholders, and any other project aspects, and also in controlling conflicts among various phases of a project, making trade-offs between competing requests and evaluating resources.

The processes involved within the project integration management knowledge area are to develop project charter, develop project management plan, direct and manage project work, monitor and control project work, perform integrated change control and close project or phase project.

The assessment result shows from the above table, that the mean maturity level of project integration management in Elmi Olindo Contractors is 3.17, which is at level 3. At this level project management is integrated with other business processes. At this level we start to see a better grip on project management practices across the company. Projects are managed in a

consistent way so there is a standard process in place. Methods have been chosen and are in use. There's a clear project lifecycle which is followed. This was consisting work at the time of project initiation, in addition a direct attention on control at the time of the lifecycle in the form of reviews, reporting, describing and analysis. The project managers were in addition also be apprehensive of their duty in the successful delivery of projects into the live situation and this delivery work was be determined.

From the table shown the respondents assessed project charter being developed at level 2.53. at this level the project charter is not effectively recorded and documented and doesn't fully give the responsibility to the project manager.

For the results of the project management plan being developed, it is at 3.13 at this level the plan is well practiced and corresponds to all stakeholders what their demands and intentions should be and also corresponds how the project's goals will be achieved.

The responses received from the interviews conducted also confirm that developing project charter is not fully practiced and emphasized that during project administration the project manager must coordinate the project work into a unified whole and ensure that the work is being performed as per the project management plan and the project's success criteria must be realized.

Also, on the monitoring and controlling of project work respondents believe it is at level 3.27 which is at a formal level. At this level the projects inspected repeatedly to guarantee it is on the right path to attain the project's achievement benchmark, and reporting the its status and performance to management and inspect the project management plan and deciding whether any parts of the project execution are straying from the plan.

4.4.3 Project Scope management Maturity Analysis

Table 9 Project Scope Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		

1	Project scope management plan processes and methodologies are developed	1	2	5	6	1	15	3.27
2	Work Breakdown Structure is created	3	1	7	2	2	15	2.93
3	A requirement management is created		1	10	3	1	15	3.27
4	Project Scope is defined	1	1	3	7	3	15	3.67
5	Scope is validated	1	3	4	4	3	15	3.33
6	Scope is Controlled		4	3	5	3	15	3.47
Mean Scope Management Maturity Level								3.32

Project Scope Management refers to the set of procedures/processes that guarantee a project's scope is precisely described and arranged. Scope Management tools and techniques allow project managers and supervisors to assign the proper amount of work needed to successfully finish a project involved with mainly with monitoring and controlling what is and what is not part of the project's scope. From contractors" perspective scope management is mainly about ensuring that all the works the contractor is doing is what originally agreed on and covered by the contract documents.

Scope management, or rather the lack of it, is one of the biggest reasons for project failure. Accurately defining what is and is not comprised in the project is without question foundational to useful project management.

The maturity survey indicates that the scope management practice maturity is found to be at average level 3.32. This is the highest of all the knowledge areas. That means on average contractors are performing above average scope management practices. Full project management process documented and utilized by most projects. Stakeholders actively participating in scope decisions.

The responses received from the interviews conducted also confirm that project scope is determined as the direction given by the project management team also in creating requirement management, business requirements are enhanced and developed with cross

functional team participation and technical requirements which are gathered and quantified using standard forms and Standard processes. However, the project managers emphasized and also from the research data WBS is not created and properly used as the reference system for change control and as a reference for integrating other project management knowledge areas.

Furthermore, the responses received from the interviews conducted confirm that scope is defined and controlled as a direction given by project management team, and a change control process is implemented on all projects, performance measurement techniques are standardized and applied.

4.4.4 Project time management Maturity analysis

Table 10 Project Time Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Project activities are identified and defined	2	1	3	7	2	15	3.40
2	Relationships among activities is identified and the activities are sequenced	1	2	5	6	1	15	3.27
3	Preparing estimate of resources (materials, people, equipment) needed to take them in to account in the schedule preparation.	3	2	3	6	1	15	3.00
4	Activity duration estimated and prepared	2	2	2	4	5	15	3.53
5	Schedule (plan) is prepared and developed for the project	2		4	4	5	15	3.67
6	Progress of project activities(schedule) continuously monitored and controlled	1	4	3	5	2	15	3.20
7	Schedule is base lined? (start and finish date are approved and fixed)	1	3	3	5	3	15	3.40
8	Network scheduling method (such as CPM, or PERT) are used	3	3	4	3	2	15	2.87

9	Resource leveling is done	1	2	4	7	1	15	3.33
10	the project schedule is updated	3	1	2	4	5	15	3.47
Mean Time Management Maturity Level								3.31

The project time management is an execution of applying or preparation of the informed control on the time spent on particular tasks or activities. Time Management develops the success, effectiveness, efficiency and productivity of a person, company or a project.

Project time management concerns to a fundamental of comprehensive project management in which a timeline is examined and improved for the finishing of a project or deliverable.

There are six procedures/processes that are involved in PMBOK time management. The processes are Definition of activities. Sequencing of activities Estimating resources. Estimating activity durations. Developing project schedule and Controlling the project schedule.

The research findings indicate that time management processes are documented and utilized by most projects. From the table above on definition of activities, the mean level is at 3.40. at this level the project lists the activities and tasks that should be done in the time of the project life cycle so that they can be used for scheduling. In this time, project managers have preceded documents and determine task dependencies.

From the research results, the project team plans the start and finish dates for each work activity as well as the overall project's beginning and finishing dates. The team also uses work sequencing, schedule and resource calculation as well as project duration restraints to attain a precise schedule. Because procedures/ processes differ and change, so does the schedule. There is a demand to develop efficient and effective scheduling procedures/processes so that it evolves to a manageable so that when there is a requirement change, it can be easily adjusted.

Also, Project base line is used to control project schedule by comparing the planned and the actual task status which is up dated on predetermined frequency not less than bi-weekly.

The responses received from the interviews conducted also affirm that project time management is considered to be more important than managing other knowledge areas. In

addition, the maturity of time management practice is higher compared to others. Overall, the time management process maturity of the contractors is found to be somewhat at formally performed level (3.31).

Also, the responses received from the interviews conducted stated that Master schedule plan was used to document time management and project management software (MS-project) was a tool used by Elmi Olindo currently for time management.

4.4.5 Project cost management maturity analysis

Table 11 Project Cost Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Project resource are planned	2	3	3	5	2	15	3.07
2	Preparing a detailed estimate detailing cost of labor, material, and machinery separately	1	3	2	6	3	15	3.47
3	Costs are estimated	2		5	5	3	15	3.40
4	Preparing detailed budget that indicate the amount allocated for resources by category (human, material, equipment etc.)	2	2	5	4	2	15	3.07
5	Time phasing the project budget (by indicating the budgeted amount on monthly/weekly etc. basis)	1	2	6	3	3	15	3.33
6	Is the budget base lined? (the budget allocated to work packages)	1	4	4	3	3	15	3.20
7	Project Cost is formally monitored and controlled (Tracking the project cost against the baseline on regular update cycle)	2	2	4	5	2	15	3.13
Mean Cost Management Maturity Level								3.24

Inadequate project cost management is one of the simplest ways to prepare a project go astray. Therefore, proper project management needs an organization understanding of the approach, concepts, techniques and tools in project cost control and budgeting.

Although cost management is considered as a constant procedure/process, it aids to tear the activity into four steps: resource planning, estimation, budgeting and control.

The entire cost management procedure/process maturity of the contractors is found to be at 3.24, which means on average Elmi Olindo Contractors perform cost management formally.

Cost systems are operational practices at this level and are used by most projects. Costs are incorporated completely into the resource library of the project office. Processes for cost assessment, monitoring, and evaluation of output also exist. For big, measurable projects, cost accounting processes are used. In addition, cost planning and monitoring is incorporated with the financial and human resources processes of the Project Office. Corporate processes-related requirements.

In the company the process of determining the resources is implemented and carried out. People (such as workers and contractors) and facilities are determined (such as infrastructure, large construction vehicles and other specialized equipment in limited supply).

At shown in the table, cost estimation is at a level of 3.40 in which the costs are quantified and associated with all the services needed are carried out in the project. As precision is the key here, estimation is arguably the most challenging of the measures involved in cost management. Project managers have weighed factors such as fixed and variable costs, overheads, inflation and time value of resources.

At this level cost budgeting is used as part of the calculation Budgeting is the method of allocating costs over a particular period of time to a certain chunk of the project, such as individual tasks or modules. Also, contingency funds are allocated to manage unforeseen expenses are included in budgets. Budgeting provides a cost benchmark from which we will continue to assess and analyze the cost efficiency of the project. If it were not for the budget, the overall projected cost would remain an abstract number and it would be impossible to calculate halfway. Evaluation of project results offers an opportunity to determine how much expenditure needs to be allocated for future phases of the project.

In the company, cost management is also used at this level the for calculating cost variances from the average and taking necessary steps, such as increasing the budget allocated or decreasing the scope of work, to correct this difference. Cost management is a continuous mechanism that is carried out over the life cycle of the project.

Also, the cost management plan is, along with the cost baseline is used as an important input for cost control. This strategy provides information such as how project success was be assessed, what is the threshold for violations, what steps was be taken if the threshold is exceeded, and a list of individuals and positions to be determined by the executive authority.

The responses received from the interviews conducted also confirm that project cost estimate reflect prior project performance which compares actual amount verse estimate cost and project budget adjusted in accordance with risk mitigation plan. A System or a tool Elmi is currently using for managing and tracking project cost is MS Excel and project engineers' spreadsheet respectively. The company has fully integrated system for cost control, project budget adjusted in accordance with the risk mitigation plan. Project cost performance is measured and controlled and the performance to baseline used to forecast future projects.

4.4.6 Project Quality management maturity Analysis

Table 12 Project Quality Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Project quality management is planned (identifying the quality requirements and standards for the project and strategies are devised)	2		5	8		15	3.27
2	quality management policies, procedures and guidelines are used	1	1	9	3	1	15	3.13
3	Quality Assurance of activities is implemented (these are processes, procedures and standards defined/developed to assure quality objectives are met)	1	1	7	3	3	15	3.40
4	inspection and control of quality of subcontractors‟ work to ensure compliance with quality requirement	1	2	3	8	1	15	3.40
5	Quality control process is implemented (determining whether project products and	1	1	4	7	2	15	3.53

	activities comply with relevant quality standards/plans)							
6	quality department or employees specializing in quality management are employed	1	2	8	2	2	15	3.13
Mean Quality Management Maturity Level								3.31

Quality control is a mechanism to ensure that all project activities required for the design, preparation and execution of the project are successful and productive with respect to the purpose and results of the project.

Project Quality Management (QM) is not a discrete, autonomous mechanism that happens at the end of an operation to assess the quality of production. It does not buy the costliest material or services available on the market. Quality and grade are not the same, grade is the attributes of a material or service as are additional features. A product can be of high quality (no defects) and of low quality (few or no extra features). Quality control is a continuous process that begins and ends with the project. It's more about stopping and avoiding than assessing and repairing low quality outputs. It is part of the project management process from the start of the project to the final step of the project closure.

Over all the quality management process maturity of the Elmi is found to be somewhat at semi-formal performed level (3.31). in this level Quality process is well documented and an organizational standard. Management involved in quality oversight for most projects. All projects are required to use quality planning standard processes. The Project Office also coordinates quality standards and assurance.

In the company quality criteria were selected and Quality Management Strategy is produced. This process includes the determination of the quality requirements that govern the project deliverables and/or the product and how the project can comply with those standards. Many projects have requirements that are given directly to them, such as building design standards.

Also, managing of Quality by Auditing of the systems was used to meet the requirements of quality. Quality Management was one of the is the method of auditing quality criteria and quality control assessment results to ensure the use of adequate quality specifications and organizational concepts. The quality audits assess and/or check that the system is operating correctly

The responses received from the interviews conducted also confirm the company uses project documents as tool to manage project quality and the quality planning practice of the company uses formal quality plan with standard templates and resource identified with specific quality responsibility, and also quality control practice uses guide line and deliverable templates available for product testing, and the quality assurance processes measured, controlled and used in all projects held by the organization.

4.4.7 Project Human Resources management maturity analysis

Table 13 Project Human Resource Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Human resource management is planned (identifying and documenting project roles, responsibilities and required skills)	1	3	5	4	2	15	3.20
2	Project team is Acquired (Defining details in the staffing plan such as desired minimum experience, skill set, when to acquire and when to release project team members from the project)	1	3	7	2	2	15	3.07
3	Project Team is developed	1	2	4	5	3	15	3.47
4	Skill requirement, Roles and Responsibilities is defined for all Project positions	2	3	2	7	1	15	3.13
5	training (formal/informal) provided to project team members?	3	7	2	2	1	15	2.40
6	Performance of team members tracked regularly and feedback provided	2	3	4	6		15	2.93
7	Human resource cost and time formally tracked, and monitored	1	3	5	6		15	3.07
8	Project organization chart is prepared	1	5	4	4	1	15	2.93

Mean Human Resources Management Maturity Level	3.03

Performance was ultimately be credited to the project team for most projects. Using the right people for a job and managing them well can be one of the best qualities of the project manager. You can't make a difference of trusting that your project team is going to get the job done right, on schedule and on budget.

Project human resource management includes the coordination and management of a project team. The team is usually made up of individuals with unique abilities and responsibilities. The project management, also known as project staff, should be involved in the preparation and decision-making process from the outset of the project. Members of the team should feel invested in the project's result. This will enhance loyalty and devotion to project priorities and goals. As the project progresses, the number of team members and their roles was change.

Overall, the human resource management process maturity of the Elmi is found to be somewhat at formally performed level (3.03). At this level Most projects follow established resource management process. Professional development program establishes project management career path. Resource forecasts used for project planning and prioritization. Project team performance measured and integrated with career development.

From the interview conducted on project managers, they were asked how did they manage human resource on their projects and what tools used to plan, prepare, and monitor performance of projects, most of them emphasized that project team needs to be defined before any project can proceed and the key part of this initial planning phase is to determine the number of people needed and the second step is obtaining staff and developing the project Team.
The responses received from the interviews conducted state that networking is a system or a tool currently the company using to plan human resource management and project team are engaged in scope and plan development, team meeting is held frequently and effectively, teams are actively encouraged and supported.

Project managers also said project problems are the main problems that threaten to hinder the progress of the project and the reactions of the project manager and the project team to these problems are critical to ensuring a successful project.

Also, the responses received from the interviews conducted affirms that developing an

efficient project team requires performance evaluations, team building events, appreciation and incentives and finally, to manage project team they emphasized it is an important process of the HR management because the progress of the project depends heavily on handling the shifting roles and responsibilities and performance criteria of the team.

4.4.8 Project Communication management maturity analysis

Table 14 Project Communication Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Performing formal project Communication management Planning	1	2	6	4	2	15	3.27
2	Project has a system/procedure for handling project documents and standard format for report.	1	1-	5	6	2	15	3.47
3	Project communication is managed (Information is distributed and Collected)	2	3	6	1	3	15	3.00
4	Project communication is monitored (performance reports prepared and provided to relevant stakeholders, communications sent out received understood and relevant feedback given)	2	3	4	5	1	15	3.00
Mean Communication Management Maturity Level								3.18

Project Communications Management shall include the processes necessary to ensure timely and effective generation, compilation, dissemination, storage, retrieval and final disposal of project information. PMBOK Supports Project Communication Management involves the following processes: Define stakeholders, Schedule Interactions, Distribute Information, Manage Stakeholder Expectations, and Report Results.

Overall, the communication management process maturity of the contractors is found to be somewhat at informally performed level (3.18). In this level at the company communications management plan is managed for all projects. Communications plans are integrated into

corporate communications structure. Active involvement by management for project performance reviews. Most projects are executing a formal project communications plan.

During the project execution phase, managing project communications can be the difference between a successful project and an unsuccessful one. In the company the communications with stakeholders that are identified within the Communications Management Plan are put into practice, and any spontaneous communications are executed as necessary. The process of creating, distributing, and storing the communications is an important part of project management, and requires the constant attention of the project manager.

Because project communication is so important to the overall success of a project, strong project control should be present. This process involves asking whether the project communications at the current point in the project have been adequate. As part of the Monitoring & Controlling process group, the project manager must include project communication control at regular project status update points. At the same time as earned value analysis, quality control, scope validation, and the other project control items take place, the project manager must ensure that each stakeholder has received the appropriate communication and whether anything should change.

According to the interviews conducted the project managers were asked what were the communicating practices used to exchange of information throughout the organization and projects. From the data almost all of the interviewees stated that hard copy and electronic standard progress reports and periodic summery reports were used to communicate with stakeholders.

Also, the responses received from the interviews conducted also affirm that the processes involved in the creation of a project from conception to completion can be severely restricted without the help of a strong communications management system and communications management provides the essential integrity of the project needed to provide an information lifeline among all project team members and this knowledge must flow downward, upward and laterally.

Many project managers quickly come to realize the need for nice, direct communication tailored to the recipient's needs. It has been stated that the success of any project depends on communication, and that either poor communication or a lack of necessary communication can be traced to most project failures.

Furthermore, the responses received from the interviews conducted also confirm that planning, managing and monitoring is an important issue, often project communication is more critical than technical work and many project managers have carried out the technical work to perfection just to find out that since communication was bad, stakeholders were not pleased

4.4.9 Project Risk management maturity analysis

Table 15 Project Risk Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Risks are prioritized (based on factors such as impact, probability, urgency etc.)	1	4	6	4		15	2.87
2	SWOT analysis (Strength, weakness, Opportunity and treat analysis) is performed	2	5	5	3		15	2.60
3	identified risks are analyzed to determine their potential impact	1	4	7	2	1	15	2.87
4	Estimating the chance of occurrence of risks (for example as low, medium, High) is performed	1	4	6	4		15	2.87
5	Is Quantitative risk analysis done? (example: simulation, decision tree analysis etc.)	1	5	6	3		15	2.73
6	Risk response strategy is developed for the prioritized risks (example: avoid, transfer, mitigate, accept)	1	4	7	2	1	15	2.87
7	Risk monitoring and control is performed	1	6	5	2	1	15	2.60
Mean Risk Management Maturity Level								2.77

As projects become increasingly dynamic, organizations need the ability to manage the uncertainty, or risk, that come along with those changes.

The process used by project managers to mitigate any possible issues that could adversely affect the timetable of a project is risk management in project management. Risk is any unforeseen occurrence that could impact the people involved in a project, processes, technology, and resources. Unlike issues, which are certain to happen, risks are events that could occur, and you may not be able to tell when. Because of this uncertainty, project risk requires serious preparation in order to manage them efficiently.

Risk management is the process of identifying, assessing, and avoiding or mitigating risks to a project in project management that can affect the expected performance. Usually, project managers are responsible for supervising the process of risk management over the lifetime of a given project.

To effectively manage risk, project managers must have a clear understanding of their objectives so they can identify any possible barriers that could impact the team's ability to produce results.

The majority of the project managers and project management team members of Elmi Olindo Contractors Plc have a negative attitude towards risk and perceive risks have damaging future effects on projects and they are destined to obstacle the achievement of their objectives. Most project managers and project management team members tend to examine situations in order to take calculated risks.
The table shows that project risk management process maturity result is very low compared to all the knowledge area. The average risk management process maturity is found to be very low 2.77. It could be generalized that there is little or no risk management practice by the contractors.

In this level No established practices or standards in place. Documentation is minimal and results are not shared. Risk response is reactive. Processes are documented and utilized for large projects. Management consistently involved with risks on large, visible projects.

The responses received from the interviews conducted shows the view that risk has a potentially disastrous future effect on projects resulting in unknown outcomes with time and cost implications and show that there is no standardized and systematic risk management process adopted at a company level and the risk management processes implemented in the

projects relies heavily on the experience of the project manager who has the ultimate responsibility for the project.

The responses received from the interviews conducted also confirm that the project manager and the project management team composed of senior project managers, project managers, assistant project managers, site engineers, office engineers etc.… are responsible for managing risks during the execution of projects. Furthermore, the Client also shares this responsibility specifically with regards to the finance/budget of the project. The consultant and the design team are also responsible to manage risks related to design modifications and specifications.

Furthermore, Analysis of company data shows that recent international clients and embassies Indian Embassy, British Embassy (Foreign & Commonwealth Office) and others are enforcing in their projects stringent requirements with regards to risk management which Elmi ‘s project management team is contractually obliged to adhere to.

As per the responses received from the interviews conducted there is no training given at a company level to develop the knowledge and awareness of risk and its management. The project manager and the project management team members rely solely on their experience and eventual academic courses taken.

Due to the low maturity level in Elmi Olindo it will be ineffective without a structured risk management framework, as this leads to:

Incomplete impact evaluation, leading to loss of Knowledge of the overall impact on the project objectives, like scope, time, cost, and quality Identification of secondary or new risks arising from the already identified risks Lack of transparency and a communication gap within and outside the team

Thus, it is very important for Elmi to set up an effective risk management framework. Instituting such a practice as a project team culture ensures:

- Conscious and focused risk identification and management
- Project progress as desired, with the least number of deviations or surprise, and in line with project and organizational objectives

- Early and effective communication of project issues to organization and project stakeholders
- An effective team building tool, as team buy-in and acceptance is assured

4.4.10 Project Procurement management maturity analysis

Table 16 Project Procurement Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Planning for procurement of goods and services needed for a project is done	2	2	3	5	3	15	3.33
2	Procurement is conducted (Quality checks of products or services delivered and cost and schedule monitoring for procurements)	2	1	7	3	2	15	3.13
3	There are standard procurement documents? (such as standard purchase order, standard sub contract / supplier agreement)	2	1	4	6	2	15	3.33
4	Progress of subcontractors and suppliers are monitored and controlled progress of	1	2	5	5	2	15	3.33
5	There is established process for Payment Review, Authorization, and Processing of subcontractors and suppliers' work/services.	2		6	5	2	15	3.33
Mean Procurement Management Maturity Level								3.29

Procurement management is a way of managing the procurement process, requisitioning, purchasing, expediting, reviewing and reconciliating procurement more effectively and productively. Managing these relationships requires having the highest quality from the external suppliers that the organization hires to help it do its business. In a relationship with suppliers that revolves around cost and time, there are constraints.

The overall procurement management process maturity of the contractors is found to be at 3.29, which means on average the contractors perform procurement management formally. In this level Process an organizational standard is used by most projects. Project team and purchasing department integrated in the procurement process. Make/buy decisions are made with an organizational perspective. Vendor is integrated into the organization's project management mechanisms.

Project procurement management includes the processes necessary to purchase or acquire products and services. From Elmi's perspective procurement management is concerned mainly with subcontract management, supply purchase management and administering the contract that it entered with the client.

The responses received from the interviews conducted also confirm that procurement was administered by managing and planning procurement. During the project planning phase, the procurement needs of the project are identified. For each external vendor requirement, a Statement of Work is composed but serves as a written statement of what work the contractor was do. Secondly procurement is conducted agreements are signed and the project management plan is updated with the new cost/budget and schedule information obtained from the vendor. After that procurement is controlled because poor subcontractor management can cause budgets and schedules to spiral out of control and derail projects when everything else has been executed flawlessly.

Also, in Elmi during regular project status intervals, the project manager reviews subcontractor agreements, progress updates, and work performance information as necessary to ensure that subcontractors are on pace to meet their budget and schedule commitments. It is not enough to assume that subcontractors are "good at what they do" and was meet their contractual obligations. When subcontractors mismanage their work, everyone loses, including the contracting organization. Thus, project managers should be aware of the status of subcontractor work and make the appropriate change requests and project management plan updates as early as possible.

4.4.11 Project Stakeholder management maturity Analysis

Table 17 Project Stakeholder Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Stakeholders are identified	2		5	6	2	15	3.33
2	Stakeholders is planned Is a stakeholder management plan prepared (is there a devised strategy on how to handle the stockholder's needs and expectations)?	1	2	9	2	1	15	3.00
3	Stakeholder engagement managed (continuous effort of communicating and working with stakeholders to influence their expectation, address their concern and resolve issues)	1	2	7	3	2	15	3.20
4	Stakeholder engagement controlled Is a strategy developed for managing each key stakeholder's expectation	1	2	8	2	2	15	3.13-
5	Are performance reports prepared and provided to relevant stakeholders?	1	1	6	5	2	15	3.40
6	stakeholder's analysis performed	1	4	7	1	2	15	2.93
Mean Stakeholder Management Maturity Level								3.17

Projects do not exist in isolation. Even if there is a defined brief, budget, program and scope of work the project is still subject to external influences. The project exists within a 'political' environment, populated by all those who have a particular stake or interest in the outcome of the project.

This political environment and the expectations of stakeholders represent significant risk to a project. It is unlikely that the requirements of all stakeholders will coincide and they were seeking to influence the project in order to meet their own requirements.

Pressure from stakeholders generates change and change increases the complexity of the management task, jeopardizing cost and program certainty.

The overall stakeholder management process maturity of the contractors is found to be 3.17, which means on average the contractors perform stakeholder management formally. In this level stakeholder have been identified and managed and monitored. This level is characterized by more generalized understanding of the importance of SRM, with an external focus on engaging stakeholders and use of tools and processes to achieve and measure this, along with a specific focus on "mutual benefits. "the use of a standard methodology is recognized and expected. Effective Stakeholder management is seen as important in the successful delivery of business initiatives and projects. Managers focus on mutuality and shared benefits.

The responses received from the interviews conducted shows that if the views of project stakeholders are not addressed and if stakeholders are not involved in the development of the project, then the project is unlikely to deliver optimum value for all involved. In order to achieve cost and time delivery, but also to optimize the gain for the client and its stakeholders, it is critical that project managers strike the right balance between stakeholder engagement and project isolation from external influence.

The responses received from the interviews conducted also confirm that project manager must know who the stakeholders are and actively manage their expectations. A project is successful when it achieves its objectives and meets or exceeds the expectations of the stakeholders.

Also, the responses received from the interviews conducted of how do they try to satisfy their stakeholders the first step to ensuring that all stakeholders of a project are satisfied is to identify them. The it is to plan stakeholder engagement specify how the project will interact with each stakeholder. All stakeholder concerns are presented and analyzed to ensure the project is set up for success. The next step is to manage stakeholder engagement-this is done by consulting the stakeholders throughout the project to ensure their needs are met. And finally, is to monitor stakeholder engagement this process must be executed on regular intervals throughout the project to assess the effectiveness of the Stakeholder Management Plan, this includes reviewing stakeholder communications, gathering information about them, or even asking them directly how they feel about the project and/or their specific concern.

4.4.12 Project Safety management maturity analysis

Table 18 Project Safety Management

No	Description	Level					Total no of Participants	Mean Maturity Level
		1	2	3	4	5		
1	Safety management planning is performed formally (include Staffing, budget, Records, and Documentation Requirements)	2	3	5	2	3	15	3.07
2	organizational policies, procedures and guidelines for Safety management are performed	2	2	6	1	4	15	3.20
3	Safety planning is performed (determining safety standards and requirements, and devising actions plan/strategies)	2	3	4	2	4	15	3.20
4	Is Hazard Analysis performed for activities of your project?	4	3	4	3	1	15	2.60
5	Safety training for workers is provided	2	2	5	3	3	15	3.20
6	Personal Protective Equipment for site employees is provided	2	2	4	2	5	15	3.40
7	safety management personnel/coordinator is assigned	2	1	2	5	5	15	3.67
8	Safety control process is implemented (inspecting whether project products and activities comply with relevant Safety standards/plans)	2	2	5	5	1	15	3.07
9	Safety monitoring and control plan prepared	2	1	5	6	1	15	3.20
Mean Safety Management Maturity Level								3.18

Effective safety management is one of the serious problems in the construction industry worldwide, especially in large-scale construction projects. Nevertheless, construction remains as one of the high-risk industries. The industry has contributed significantly to the economic growth of the country. However, when construction safety management is not implemented systematically, accidents will happen and this can affect the economic growth of the country.

Overall, it could be considered that safety management is performed average in the management of construction projects. An average maturity of 3.18 is determined for the Elmis safety management process. But on Hazard Analysis its it very lows as its not being done at all. Because safety management in construction project as one of the important elements to project performance and success. It must be emphasized on awareness and the factors that lead to the safety cases in construction project.

The responses received from the interviews conducted shows occupational health, safety, and the environment (HSE) should be key components of the planning process and these stakeholders should be a major part of the planning process.

Finally, the responses received from the interviews conducted also confirms that safety professionals are put in place of every project to control the practices and procedures of safety management which includes performing organization that determine safety policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken. This entails of Planning for Safety, Performing Safety Assurance and Performing Safety Control.

5. Chapter Five: Discussion, Conclusions and Recommendations

5.1 Introduction

Nowadays, pressure of timely and on budget delivery of projects is the main concern of companies which is why they are mostly concerned with effective project management in their organization. According to the Project Management Institute (PMI), project management is "meeting project requirement through the application of knowledge, skills, tools and techniques to project activities". PMI also suggests that in order for project managers to successfully implement a project he or she must coordinate all the knowledge area of expertise.

Construction project management is the application of knowledge and skills required to accomplish project success. However, knowledge management practices were not adequately addressed in Elmi Olindo contractors project industry. Understanding the state of construction project management knowledge maturity level was the point of research.

The study set out with the objective of assessing and examining the current construction project management knowledge maturity level in construction projects – evidence from Elmi Olindo Contractors Plc with the specific objectives of:

1. Assessing whether and to what extent the processes and practices under each of PMBOK"s Project Management knowledge areas are being applied by Elmi Olindo Plc in managing their the five currently undertaken construction projects.

In an effort to achieve these objectives an examination into the literature of the subject matter has been undertaken. The background of Elmi Olindo Contractors Plc and the construction projects being implemented in Addis Ababa, at the time of the study were analyzed. Detailed views and perceptions with regards to project knowledge and project maturity have been outlined from decision makers i.e., project managers and project management team members. A survey was conducted by the researcher to assess project knowledge management maturity of project managers and project management team members in performing the works and the Project management practices employed at a company level as well as in the construction projects undertaken by Elmi Olindo Contractors Plc. Primary data collected through questionnaire survey and interviews was analyzed and the results were presented in the

previous chapter. This chapter covers the interpretation and discussion of findings, recommendations, and conclusions reached from the study.

5.2 Discussions

According to Hailemeskel (2013) the key challenges identified within the Ethiopian construction industry are: shortage of skilled and unskilled manpower, machineries and tools, absence of appropriate standards and guidelines, lack of strong institutional capacity to oversee the construction industry, lack of construction project management and control skills and many others. These challenges also apply to Elmi Olindo contractors and also have contributed to poor performance level of the industry indicated by delay, cost overrun, poor quality delivery.

Furthermore, the responses received from the interviews conducted also confirm that the Elmi Olindo is seriously affected by political instability, lack of foreign currency, lack of skilled labor, and absence or loosely enforced government regulations related to health and safety and environmental issues.

However, analysis of company data shows that recent international clients and embassies like Indian Embassy and British Embassy (Foreign & Commonwealth Office) and others are enforcing in their projects stringent requirements with regards to risk management, health and safety management, quality management, environmental protection which Elmi ‘s project management team is contractually obliged to adhere to.

It is very clear that companies function in a very complex environment that threatens much of their operations with different variables. Project management makes an attempt to tackle this environmental variable. The more advanced an organization is, the more capable it is of implementing procedures, formalizing decision-making, planning and therefore being effective in project execution.

The main aim of this thesis research was to assess the PM maturity level in the company of Elmi Olindo and identify priority and problem area and recommend ways for improvement efforts. Recommendation for this research was to propose a way of improvement for further level of maturity. Thus, in this regard this research result has found the following major findings.

Overall, the construction PM knowledge process maturity of the Elmi is found to be at average level. The average mean of all knowledge areas covered under the research is at a maturity level of 3.17. This implies that the maturity level of the company is at level 3 but it is approaching to level 4 in which it at level of managed process.

This shows on average Elmi PM maturity is at semi formal level. At this stage, an organization achieves its generic and specific goals. Processes are well understood; as a result, these processes have become standards, procedures, tools and methods. All PM processes are in place and established as organizational standards. but in some parts of the knowledge areas on average Elmi performs the knowledge areas simply without following methodized approach or guide line, depending entirely on the knowledge and experience of the project manager or project team.

From the results the knowledge areas of Scope, procurement, cost, time, and quality management show comparatively higher level of maturity compared with other PM knowledge areas. These knowledge areas are more or less being performed formally by the majorities of the Project managers. Whereas the knowledge areas of Human Resource, integration and communication management are comparatively at lower level is performed informally by the majorities of the project managers. The remaining two knowledge areas of risk and safety management are the least matured knowledge areas. This is due to the low level of recognition and emphasis given to the PMBOK knowledge areas. These findings are indicative of the average level of PM development in the elmis construction industry.

According to the interview conducted, the company engineers explained and clarified that since they have been at the company, they have followed a very conventional PM way until recent years, where much of their work depended on the experience and expertise but the has recently begun to apply formal PM techniques and has already recognized a significant shift in meeting its objectives.

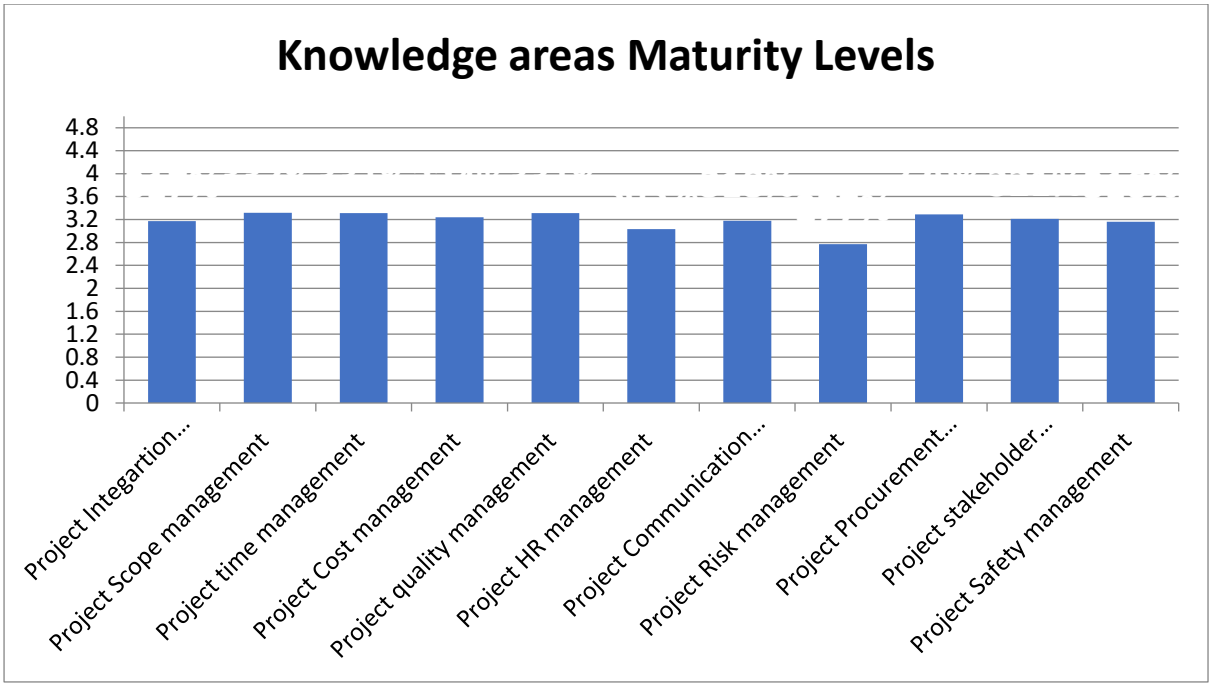

Figure 8 Knowledge areas maturity level

5.3 Conclusions

The main aim of this thesis research was to assess the PM maturity level in the company of Elmi Olindo and identify priority and problem area and recommend ways for improvement efforts. In an effort to achieve the study ‘s objectives, the conclusions drawn are presented as follows:

1. The general profile of the respondents shows that almost all of the respondents to the questionnaires and interviews of this study were male. Consequently, this shows that the decision-making roles in projects (project managers and project management team members) at Elmi Olindo Contractors Plc are predominantly taken by male professionals and this confirms the view of Nuanthip and Tanit (2012) that the construction industry is associated with male domination.

2. The majority of the project managers and project management team members of Elmi Olindo Contractors Plc have given a low level of recognition and emphasis to the PMBOK knowledge areas and in most parts Elmi performs the knowledge area formally but in some parts of the knowledge areas on average Elmi performs the knowledge areas simply without following methodized approach or guide line, depending entirely on the knowledge and experience of the project manager or project team.

3. Elmi PM maturity is at semi formal level and their PM practice maturity is at basic level. Processes are well understood; as a result, these processes have become standards, procedures, tools and methods. All PM processes are in place and established as organizational standards.

4. Most of the project managers and project management team members of Elmi Olindo Contractors Plc perceive the Ethiopian construction industry is extremely volatile that shows low level understanding of project knowledge area and most of the construction projects are facing many challenges like time delays, cost overruns and quality compliance issues. Furthermore, the industry is also affected by lack of available budget, poor scheduling and construction methodologies, political instability, lack of foreign currency, lack of skilled labor, poor contract management skills, poor quality, cost overruns, inadequate health and safety policy schemes on the contractors 'side, absence or loosely enforced government regulations related to health and safety and environmental issues.

5.4 Recommendations

Based on the findings and conclusions of the study, recommendations are forwarded.
Elmi Olindo Contractors Plc should organize workshops, trainings and experience sharing platforms in order to understand and shape the project knowledge areas and perceptions of decision makers of projects (i.e., senior project managers, project managers and project team members) as well as improve their knowledge and awareness of project knowledge management processes and practices.
Furthermore, Elmi should combine its extensive experience in the industry as well as its exposure to international standards and best practices through its international clients in order to develop a project knowledge management system that is duly acknowledged by senior management, enforced and implemented in all of its construction projects.

The level of construction PM knowledge maturity found in Elmi shows how it is at an average. Thus, improvement efforts need be under taken to improve the current condition. In this regard this research recommends the following specific actions to be undertaken.

1. Providing training and mentoring to the employees to improve their PM knowledge and practice capacity to help them improve their PM capability which was help success to be achieved.

2. Giving special emphasis to lower level of maturity sectors like communication, risk and procurement, human resources and safety management. As the review of literature showed management of construction projects is highly constrained by scope change, resources availability and high uncertainty. Thus, focusing on the management of communication, risk and procurement, human resources and safety management can significantly help lower their negative impact and improve performance of projects through better planning and use of the safety planning and monitoring of the risks and management of human resources.

3. Encouraging stakeholders to Promote at above average level of maturity in order to obtain successful result and ensure control of their projects. At above average level of process maturity; methodized approach, guides and standards are used, and expectations are more or less clarified, thus helping create clarity and lowering risks assumed by subordinates and increase their confidence to make decision. Further, the use of guides provides consideration of important aspects, thus significantly contributing to the performance of the knowledge areas. The use of generic guides such as PMBOK in this regard may significantly help. The acquirement of above average level of practice maturity means that the organization is performing all the practices that are mandatory to attain the goal of the knowledge areas, thus maximizing the chance of attaining knowledge area goals and hence, attainment of project objectives.

4. Conducting continuous assessment of maturity by the Project managers to know the success of improvement efforts they undertook and to devise a response plan for further improvement measures.

5.5 Areas of Future Research

In the sense of further research work, one needs be follow to explore scopes which are not examined in this research and to clarify the concepts constructed and further raise our understanding, and contribute to the construction PM knowledge areas. Thus, this research suggests the following for further research and investigation:

1. Conducting a comprehensive research to identify the processes and practices under each management knowledge areas.

2. Conduct research to assess and continuous overseeing of practices under each of the construction PM knowledge areas.

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APPENDICES

Questionnaire

Part I – General Information

Direction: Please provide the requested information on the space provided

1. Position in the company _____

A. Senior project manager **B.** Project manager **C**. Assistant Project Manager **D.** Site Engineer

E. General Forman **F.** Other (please specify)

2. What is your education level?_____

A. Masters level **B.** Bachelors **C**. Certificate **D.** Short-term

3. Have you received any Project Management related training?

A.Yes **B.** No

If yes what was the highest level of training you received?

A.Masters level **B.** Bachelors **C**. Certificate **D.** Short-term training

E. As a course in a related program of study **F.** Other (please specify)

4. Have you worked as Project Manager? _____

A. Yes **B**. No If yes for how long?_____.

5. What is your age? _____

A. 20-25 **B**. 26-30

C.31-40 **D.** 41-50

E.50-60 **F.** Other (pleasespecify)

6. What Project are you working on currently?(Optional) _____

7. How Much experience do you have? _____

A. 1-3 years **B.** 3-6 years

C. 6-10 years **D**. 10-15 years

E. Above 15 years

8. What is your Gender?_____

A. Male **B.** Female

9. Approximately, for how long have you been working in this organization?_____

10. Do you think Management of your Organization recognizes the need of Project Management? ___

A.Yes **B. No** **C.** I do notknow

11. Are Project Management procedures and methodologies applied formally in managing projects in the Organization _____

A.Yes **B. No** **C.** I do notknow

Part II- Project management practice maturity questions

General Direction

Answer all the Questions that follow based on your knowledge of practice of Project Management in the project you are participating in below are the description for the maturity levels given...

Please Choose by making X in the Box in the second page. Below is the description for the no 1-5.

1. ***If the description approximates the condition given below in your project(organization).***
   a) Processes and tools of Project Management is informal
   b) There is no formal procedure
   c) No proper documentation
   d) No established practices
   e) Ad hoc work practices
2. ***If the description approximates the condition given below in your project(organization).***
   a) Basic processes and tools of Project Management are established
   b) There are structured processes but informal procedures
   c) Little Documentation is performed
   d) Minimal Data collection and tracking of activities
   e) Project management implementations not consistent
3. ***If the description approximates the condition given below in your project(organization).***

a) Project management documentation isutilized

b) Training programs areavailable

c) Organization's standardmanagement process exists

d) Formal documentationexists

4. ***If the description approximates the condition given below in your project (organization).***

a) Quantitative objectives for quality and processes performance are established

b) Project Management team are clearly aware of their roles

c) Project Management decision is based on quality and process performance

d) Detailed Measures of process performances are collected and analyzed

e) Benchmarking is done is decision making

5. ***<u>If the description approximates the condition given below in your project(organization).</u>***

a) Process performance continually improved

b) Project managementis highly utilized

c) Lesson learned is recorded and used forimprovement

d) Project management processes are continuouslyunderstood

e) Continuous processes improvement is enabled by feedback

1. Project Management Practices

No	Description	1	2	3	4	5
1	Project management processes and methodologies are developed					
2	Project management Importance, recognition and need is					
3	Project management training is given.					
4	Project managers knowledge of project management is high					
5	Project management process methodologies and procedures are applied in managing projects					

2. Project Integration Management Process

No	Description	1	2	3	4	5
1	Project management plans are developed					
2	Project charter is developed					
3	Project knowledge is managed					
4	Project work is monitored and controlled					
5	Project work is managed and directed					

3. Project Scope management

No	Description	1	2	3	4	5
1	Project scope management plan processes and methodologies are developed					
2	Work Breakdown Structure is created					
3	A requirement management is created					
4	Project Scope is defined					
5	Scope is validated					
6	Scope is Controlled					

WBS is the breakdown of the project work into smaller, more manageable pieces of work, with each descending level of the WBS representing an increasing detailed definition of the project work

4. Project Time management

No	Description	1	2	3	4	5
1	Project activities are identified and defined					
2	Relationships among activities is identified and the activities are sequenced					
3	Preparing estimate of resources (materials, people, equipment) needed to take them in to account in the schedule preparation.					

4	Activity duration estimated and prepared					
5	Schedule (plan) is prepared and developed for the project					
6	Progress of project activities(schedule) continuously monitored and controlled					
7	Schedule is base lined? (start and finish date are approved and fixed)					
8	Network scheduling method (such as CPM, or PERT) are used					
9	Resource leveling is done					
10	the project schedule is updated					

5. Project Cost management

No	Description	1	2	3	4	5
1	Project resource are planned					
2	Preparing a detailed estimate detailing cost of labor, material, and machinery separately					
3	Costs are estimated					
4	Preparing detailed budget that indicate the amount allocated for resources by category (human, material, equipment etc)					
5	Time phasing the project budget (by indicating the budgeted amount on monthly/weekly etc. basis)					
6	Is the budget base lined? (the budget allocated to work packages)					
7	Project Cost is formally monitored and controlled (Tracking the project cost against the baseline on regular update cycle)					

6. Project Quality management

No	Description	1	2	3	4	5
1	Project quality management is planned (identifying the quality requirements and standards for the project and strategies are devised)					
2	quality management policies, procedures and guidelines are used					
3	Quality Assurance of activities is implemented (these are processes, procedures and standards defined/developed to assure quality objectives are met)					
4	inspection and control of quality of subcontractors‟ work to ensure compliance with quality requirement					
5	Quality control process is implemented (determining whether project products and activities comply with relevant quality standards/plans)					
6	quality department or employees specializing in quality management are employed					

7. Project Human Resource management

No	Description	1	2	3	4	5
1	Human resource management is planned (identifying and documenting project roles, responsibilities and required skills)					
2	Project team is Acquired (Definingdetails in the staffing plan such as desired minimum experience, skill set, when to acquire and when to release project team members from the project)					
3	Project Team is developed					
4	Skill requirement, Roles and Responsibilities is defined for all Project positions					
5	training (formal/informal) provided to project team members?					
6	Performance of team members tracked regularly and feedback provided					
7	Human resource cost and time formally tracked, and monitored					

8	Project organization chart is prepared					

8. Project Communication management

No	Description	1	2	3	4	5
1	Performing formal project Communication management Planning					
2	Project has a system/procedure for handling project documents and standard format for report.					
3	Project communication is managed (Information is distributed and Collected)					
4	Project communication is monitored (performance reports prepared and provided to relevant stakeholders, communications sent out received understood and relevant feedback given)					

9. Project Risk management

No	Description	1	2	3	4	5
1	Risks are prioritized (based on factors such as impact, probability, urgency etc.)					
2	SWOT analysis (Strength, weakness, Opportunity and treat analysis) is performed					
3	identified risks are analyzed to determine their potential impact					
4	Estimating the chance of occurrence of risks (for example as low, medium, High) is performed					
5	Is Quantitative risk analysis done? (example: simulation, decision tree analysis etc.)					
6	Risk response strategy is developed for the prioritized risks (example: avoid, transfer, mitigate, accept)					

7	Risk monitoring and control is performed					

10. Project Procurement management

No	Description	1	2	3	4	5
1	Planning for procurement of goods and services needed for a project is done					
2	Procurement is conducted (Quality checks of products or services delivered and cost and schedule monitoring for procurements)					
3	There are standard procurement documents? (such as standard purchase order, standard sub contract / supplier agreement)					
4	Progress of subcontractors and suppliers are monitored and controlled progress of					
5	There is established process for Payment Review, Authorization, and Processing of subcontractors and suppliers' work/services.					

11. Project Stakeholder management

No	Description	1	2	3	4	5
1	Stakeholders are identified					
2	Stakeholders is planned Is a stakeholder management plan prepared (is there a devised strategy on how to handle the stockholder's needs and expectations)?					
3	Stakeholder engagement managed (continuous effort of communicating and working with stakeholders to influence their expectation, address their concern and resolve issues)					
4	Stakeholder engagement controlled Is a strategy developed for managing each key stakeholder's expectation					
5	Are performance reports prepared and provided to relevant stakeholders?					
6	stakeholder's analysis performed					

12. Project Safety management

No	Description	1	2	3	4	5
1	Safety management planning is performed formally (include Staffing, budget, Records, and Documentation Requirements)					
2	organizational policies, procedures and guidelines for Safety management are performed					
3	Safety planning is performed (determining safety standards and requirements, and devising actions plan/strategies)					
4	Is Hazard Analysis performed for activities of your project?					
5	Safety training for workers is provided					
6	Personal Protective Equipment for site employees is provided					
7	safety management personnel/coordinator is assigned					
8	Safety control process is implemented (inspecting whether project products and activities comply with relevant Safety standards/plans)					
9	Safety monitoring and control plan prepared					

Interview

1. How do you best describe the project management practices in your organization?
2. How do you best describe the integration management used in your organization?
3. How do you best describe the practices of scope management in your organization

while executing projects?

- Is Scope defined, monitored and controlled?
- What are the processes involved and techniques used?

4. How do you best describe the practices for schedule management concerning project activities?
    - What tools are used for scheduling, sequencing and planning?
5. How do you manage cost requirements for all projects?
    - What are the tools used to plan, estimate, report and control costs of projects?
6. How is quality maintained and requirements met in your organization & projects?
    - What are the tools used to assure quality for the projects?
7. How do you manage human resource in your organization & projects?
    - What are the tools used to plan, prepare, and monitor performance of projects?
8. What are the communicating practices used to exchange of information throughout the organization and projects?
9. How do you best describe the practices of Risk management in your organization while executing projects?
    - How do you identify, evaluate and mitigate risk?
10. How is procurement performed in your organization?
11. How do you try to satisfy your stakeholders?
12. How do you best describe the practices for safety management concerning project activities?
    - What are the procedures used for safety management practices?
    - What are the policies procedures and guidance that are in place?