ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

DEPARTMENT OF BUSINESS ADMINISTRATION AND INFORMATION SYSTEM

ASSESSING THE LEVEL OF PROJECT MANAGEMENT MATURITY IN ETHIOTELECOM: THE CASE OF TELECOM EXPANSION PROJECTS

BY

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PROJECT WORK SUBMITTED TO ADDISABABA UNIVERSITY SCHOOL OF COMMERCE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF ARTS DEGREE IN PROJECT MANAGEMENT

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STATEMENT OF DECLARATION

I, Gebrewahd Hadgu, declare that this research entitled "**ASSESSING THE LEVEL OF PROJECT MANAGEMENT MATURITY IN ETHIOTELECOM: THE CASE OF TELECOM EXPANSION PROJECTS"** is the outcome of my own effort and study. This study has not been presented for the award of Degree or Diploma Program in this or any other institution. All sources of materials used for the project have been duly acknowledged.

Gebrewahd Hadgu

Signature: _____

Date: _____

CERTIFICATION

This is to certify that Gebrewahd Hadgu has completed his thesis entitled "**ASSESSING THE LEVEL OF PROJECT MANAGEMENT MATURITY IN ETHIOTELECOM: THE CASE OF TELECOM EXPANSION PROJECTS**", In my opinion all the materials used for the thesis have been duly acknowledged and his thesis is appropriate to be submitted as a partial fulfillment for the requirement of Master of Arts Degree in Project Management (MAPM).

Advisor**:** ***WUBISHET BEKALU (PHD)***

Signature: _____

Date: _____

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LIST OF ACRONYMS / ABBREVIATIONS

APM: Association of Project Management

ETC: Ethiopian Telecommunication Corporation

CBS: Converging Billing System

CC: Call Center

CMM: Capability Maturity Model

CRM: Customer Relation Management

mVAS: Multivalued Added Service

NGN: Next Generation Network

OGC: Office of Government Commerce

OPM_3: Organizational Project Management Maturity Model

P_3M_3: Project, Program and Portfolio Management Maturity Model

P_fM_3: Portfolio Management

PgM_3: Program Management

P_jM_3: Project Management (in Project, Program and Portfolio Management Maturity Model)

PMBOK: Project Management Body of Knowledge

$(PM)^2$: Project Management Process Maturity Model

PMI: Project Management Institute

PMMM(s): Project Management Maturity Model(s)

PSTN: Public Switch Telecom Network

SPSS: Statistical Package for Social Science

TEP: Telecom Expansion Project

ZTE: Zhongxing Telecom Enterprise

ABSTRACT

This research is conducted to assess the current level of project management maturity in Ethio-Telecom the case of Telecom Expansion Projects through assessing the ten PMBOK's project management knowledge areas and find out the least and highly matured knowledge areas. To achieve this purpose, the research first provided a review of the common PMM models upon which PM solutions model was selected for this study. Second, questionnaire was distributed among 53 Telecom Expansion Projects employee participated in the implementation of these projects and selected using simple random sampling from each role-based stratification. Apart from survey questionnaires, interview with project managers and document reviews were also conducted. Finally, the collected was analyzed using descriptive statistics by applying SPSS. The overall project management maturity of the company is at level 2.46 approximately 2 on a relative scale of 1 (lowest) to 5 (highest). The most mature knowledge areas are project procurement management, project risk management and Human resource knowledge areas approximately leveled at maturity level 3 and the least matured knowledge areas are the project time management and project cost management approximately leveled at maturity level 2. The findings suggests that basic project processes exist in the company but are not considered an organizational standard and management supports the implementation of projects management but understanding and involvement is not consistent / applied to all projects.

Key words: Project Management Maturity, Maturity Level, Maturity Model.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Project management maturity is a concept used in an organizational context to describe the level of project management capability within an organization. The concept of Maturity derives from the root word 'mature' which equates to becoming fully grown and developed. According to Cooke and Tate (2011), an organizations project management maturity is an indicator of the extent to which it possesses capability to continuously accomplish what it sets out to undertake to the level and quality it intended, or it desired through the use and practice of appropriate project management methodology. Andersen & Jessen (2003) suggested that the state of organizational project maturity ascribes a meaning that equates an organization to a state of being perfectly conditioned to undertake implementation of its projects and deal with attendant challenges as it strives to achieve the intended goals and objectives for which the project was being implemented.

Assessing of project management maturity enables organizations to identify on how to improve project implementation (Brookes, Buter, Dey & Cark,2014) and to identify where project management improvements are required, give clear indications of strengths and weaknesses, lead to significant competitive advantages, and benchmark an organization against its competitors (Archibald and Prado, 2014b). The significance of assessing project management maturity is also best understood in the context of the increasing preference and use of project management approaches and techniques in the delivery of projects and programs in both public and private sectors globally (PwC., 2007; Burke 2003). The key features and attributes of project management maturity include the presence and use of standard methods to manage the knowledge areas of scope, time, cost, quality, communication, human resources, procurement and integration (PwC., 2007; Burke, 2003; Cooke & Tate, 2011; Ibbs & Kwak, 2002).

One way of assessing project management maturity of an organization is deploying of an assessment tool by using different project management maturity models and structured standard questionnaires. Project Management Maturity models are also closely linked to project management maturity, which in turn, shows different concepts and ideas as they try to advance an organization towards being a mature organization. The aim of the models are to express maturity as a specific process of explicitly defining, managing, measuring and controlling the evolutionary

growth of an entity. Maturity models therefore serve as a benchmark to determine whether its project management processes are adequate; enable it to compare its management of projects with best practice or against its competitors (Hillson, 2003). Project Management Maturity models define a set of maturity levels used for the management of projects. Most typically have five maturity levels, each comprising some process areas (or focus areas), which are necessary for the management of projects. Project management maturity (PMM) is a level of maturity to which an organization has applied project management techniques and is using them in a proper and mature way (Supić, 2005). A project management maturity model provides the progressive development of an enterprise-wide project management approach, methodology, strategy and decision-making process (PM Solutions, 2011).

An organization has achieved full project management maturity (the highest level) when it has met the requirements and standards for project management effectiveness and can demonstrate improvements such as on-time project delivery, cost reductions, organizational efficiency and profitability (PM Solutions, 2011). The global context and situation regarding organizational project management maturity was illustrated in the global survey conducted by PricewaterhouseCoopers in which organizations were assessed on the state of project management maturity (PwC, 2007). The key finding in the survey was the discovery of a clear link between higher project maturity levels and high project.

Thus, conducting a research on the assessment of project management maturity level in the case of Ethio-Telecom will give an organization a benchmark on their current environment, how project management is being used, and most importantly, where to focus improvement efforts to advance to higher levels of maturity and implement its IT projects successfully.

1.2 Background of the Organization and Its Project Management Practice

Ethio-Telecom, previously known as the Ethiopian Telecommunications Corporation (ETC), is an integrated telecommunications services provider in Ethiopia, providing internet and telephone services. It is owned by the Ethiopian government and maintains a monopoly over all telecommunication services in Ethiopia. According to National Bank of Ethiopia annual report (2015/16), there were 46 million mobile phone users, 1.1 million fixed lines, and 8.4 million General Packet Radio Service (GPRS) subscribers in a country of over 95 million people.

The company continues to launch and implement huge projects in expanding and upgrading the country's telecommunication system and striving to deliver these projects effectively and successfully. It has registered several accomplishments required to transform the company to a modern telecom service provider by implementing and managing two consistent huge projects in recent time.

The first one is a Next Generation Network (NGN) project contract agreement worth of US1.5 Billion Dollar of vendor financing in 2006 with Chinese Zhongxing Telecom Enterprise (ZTE) to come up with dynamic technological revolution in the telecom industry and with great vision to see the entire country connected with state of the art of Information Communication Technology (ITC) infrastructure that provide highly qualitative, reliable and secure communication service at affordable price which support data, voice and multimedia. This project contract agreement covered projects like mobile coverage expansion project, Fixed Line Next Generation Network (LF-NGN) project, Code Division Multiple Access (CDMA) project, urban and rural, Transport network (optical and Microwave),Network Operational Center (NOC) and Call center projects (Ethio-Telecom Project Statement of Work Agreement,2006).

And the second huge project that the researcher conducted this study that was managed and deployed recently is called Telecom Expansion Projects (TEP) Kicked off in January 2013 with a total project cost of 1.6 Billion USD with China's ZTE and Huawei Corporation and the Swedish firm Ericsson. These projects are a continuation of the NGN projects. Generally, it was focused on providing telecom services to all of Ethiopia's 15,000 rural villages, with dedicated lines for agriculture, education, health, and consumer use. Specifically it was focused to achieve target objectives of GTP I on mobile and Broadband (BB) service as defined by the FDRE government, improve network Quality of service (QoS), increase coverage and capacity on mobile services, improve 3G network coverage in rural areas, introduce LTE in Addis Ababa on hotspot area, build strong infrastructure with latest technology and enhance and modernize the information system domain of the company like Converging Billing System(CBS) , Customer Relation Management(CRM) , Call Center(CC), Multivalued added services (mVAS), Operation Support System(OSS) and different security projects (Ethio-TelecomTEP charter, 2013).

Launching and implementing of the above two successive projects indicates that the company has been using methods and tools of Project Management (PM) in implementing these projects. In the telecom companies like Ethio-Telecom manages and implements such kind of huge projects, delivering quality end products within budget and within schedule, meeting user requirement requires to perform a health check (assess) of its project management practices to properly ascertain the current state of project management and make corrections for any deficiencies noted (PM Solutions,2012) .Hence, it is important to assess and know the company's maturity level of project management commitment to be better prepared in dealing with the less matured and to build on the highly matured project management knowledge areas.

1.3 Statement of the Problem

Many organizations conduct a periodic research to perform a health check (assess) of its level of project management maturity to properly ascertain the current state of project management and make corrections for any deficiencies noted. Measuring project management maturity through a formal assessment process gives an organization a benchmark on their current environment, how project management is being used, and most importantly, where to focus improvement efforts in order to advance to higher levels of maturity and improve project success. Given such a worldwide diffusion of research on project management maturity and its importance, it is hard to get evidence or research aimed at studying its current level of project management maturity, highly matured and least matured knowledge areas (strength or weakness) in Ethio-Telecom even though the company is managing and implementing huge IT projects throughout the country. This is related with, if they can't assess it its level of project management maturity, they can't measure. If they can't measure it, they can't understand it. If they can't understand it, they can't Managed it. If they can't Managed it, they can't optimize it. This leads to immature in project management and projects becomes unsuccessful or distressed. Therefore, this research is a foundational work of assessing and determining where the company is in terms of level of project management maturity and where it needs to go, while also filling up the research gap in this area of study in the company.

1.4 Basic Research Questions

In order to accomplish the objective of the study and keep focus on what is relevant for this research, the following research questions were developed:

- What is the level of maturity with respect to each of the project management knowledge areas?
- What is the current project management maturity level of the company in managing projects?
- What are the project management knowledge areas that are the highly and least matured?

1.5 Objective of the Study

1.5.1 General Objective

The general objective of this research is to assess the level of project management maturity of the company in managing its projects.

1.5.2 Specific Objectives

- To assess the level of maturity with respect to each of the project management knowledge areas.
- To assess the current project management maturity level of the company in managing projects.
- To find out the highly and least matured project management knowledge areas in the company.

1.6 Significance of the Study

The first significant of this research assessing project management maturity level result will signify the company in designing improvement action, because this could be the initial benchmark project management maturity assessment information. Further, the same effect could be used as a baseline to compare the success of or impact of future development efforts.

Secondly, the assessment of low matured and highly matured project management knowledge areas could be used to identify project management knowledge areas that need improvement.

Thirdly, as there is no any research related to assessment of project management maturity level in the company it serves as a reference material for anyone who will undertake a further study on the same or related topic.

1.7 Scope of Study

Even though the company is managing both vendor financing projects like telecom expansion projects which costs approximately 1.5 billion dollars as well as self-financing projects. This study was confined to vendor financing telecom expansion projects in assessing the level of project management maturity of the company as these projects costs a significant amount of money and takes long time duration when compared with the self-financing projects they are few and managed by the functional units. The sample of the study comprised both management personnel and non-management level within the company who have participated in the implementation of telecom expansion projects. The research is conducted using structured questionnaires developed by Project management Solutions maturity model. And interview questions and document reviews were also employed to increase the trustworthiness of the findings of the research. The structured questionnaires and interview questions is limited to the PMBOK 5th edition's ten project management knowledge areas.

1.8 Limitation of the Study

Limitations are matters and occurrence that arise in a study which are out of the researcher's control. Every study, no matter how well it is conducted and constructed, has limitation. Remember that there is no perfect study. Although the study has reached its purpose, there were some unavoidable limitations. The limitation of the study is mainly divided into two. Difficulty of getting secondary data available from the organization side linked to project management maturity level. The survey result could be affected by acquiescence bias. It is a category of response bias in which respondents to a survey have a tendency to tick similarly to all the questions in a measure or responds the questionnaires carelessly. This bias in responding may represent a form of dishonest reporting because the participant automatically endorses any statements, even if the result is contradictory responses.

1.9 Definition of Key Terms

- Project: A project is a temporary endeavor undertaken to create a unique product, service or result.
- Project management: The application and integration of modern management and project management knowledge, skills, tools and techniques to meet project goals.
- Project Management Maturity: - it refers to the progressive development of enterprise wide project management practices, approaches, and process

1.10 Organization of the Study

This research paper is organized into five chapters. The first chapter presents the background of the study, background of the organization and its project management practice, statement of the problem, objective of the study, research questions, significance of the study, scope/ delimitation of the study. The second chapter will review literatures pertinent to the subject matter of the study. Then the third chapter presents the research methodology followed by data analysis and presentation, which is chapter four. On the final fifth chapter Summary, conclusions and recommendations is presented.

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Project Management

According to PMBOK (2013) a project is a temporary endeavor undertaken to create a unique product, service or result. The temporary nature of projects indicates that project has a definite beginning and end. Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (PMBOK (2013).

2.1.2 Project Management Knowledge areas

According to PMI (2013) PMBOK® Guide a project management Knowledge Area is an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques. Although the Knowledge Areas are interrelated, they are defined separately from the project management perspective. According the PMI there are ten general project management knowledge areas which are: project integration management, project scope management, project time management, project cost management, project quality management, project human resource management, project communications management, project risk management, project procurement management and project stakeholder management. These ten Knowledge Areas are used in most projects most of the time PMI (2013).

The maturity assessment comprises of the below mentioned ten knowledge areas, which are further divided into key component in order to measure and assess the maturity of an organization. These key components are examined independently without affecting the other components.

Project Integration Management

Project integration management includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the project management process groups. In the project management context, integration includes characteristics of unification, consolidation, communication, and integrative actions that are crucial to controlled project execution through completion, successfully managing stakeholder expectations, and meeting requirements (PMI, 2013).

Project Integration Management includes making choices about resource allocation, making trade-offs among competing objectives and alternatives, and managing the interdependencies among the project management Knowledge Areas. Project integration management Knowledge Areas includes the six processes (PMI, 2013):

- Develop project charter- it is the process of developing a document that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities.
- Develop project management plan- it is the process of defining, preparing, and coordinating all subsidiary plans and integrating them into a comprehensive project management plan. The project's integrated baselines and subsidiary plans may be included within the project management plan.
- Direct and manage project work-The process of leading and performing the work defined in the project management plan and implementing approved changes to achieve the project's objectives.
- Monitor and control project work-The process of tracking, reviewing, and reporting project progress against the performance objectives defined in the project management plan.
- Perform integrated change control-The process of reviewing all change requests; approving changes and managing changes to deliverables, organizational process assets, project documents, and the project management plan; and communicating their disposition.
- Close project or phase- The process of finalizing all activities across all the Project Management Process Groups to formally complete the phase or project.

Project Scope Management

According to PMI (2013) project scope management Knowledge Area comprises the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Managing the project scope is primarily concerned with defining and controlling what is and is not included in the project. This Knowledge Area includes the six processes (PMI, 2013):

- Plan scope management- The process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled.

- Collect requirements - The process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives.
- Define scope - The process of developing a detailed description of the project and product
- Create WBS - The process of subdividing project deliverables and project work into smaller, more manageable components.
- Validate scope- The process of formalizing acceptance of the completed project deliverables.
- Control scope- The process of monitoring the status of the project and product scope and managing changes to the scope baseline.

Project Time Management

According to Saylor.org (2009), the definition of project success often includes completing the project on time. The importance of ensuring work proceeds efficiently within individual tasks, along with the interfacing of related tasks, is a key message in project time management (Pasian, 2011). The ultimate measure being project success, based on effective control of time management processes, tools and practices. The development and management of realistic project schedule and project plan is a primary responsibility of the project manager to complete the project on time. Accordingly, PMI (2013) PMBOK® Guide this knowledge includes the processes required to manage the timely completion of the project.

- Plan schedule management: The process of establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.
- Define activities: The process of identifying and documenting the specific actions to be performed to produce the project deliverables.
- Sequence activities: The process of identifying and documenting relationships among the project activities.
- Estimate activity resources: The process of estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity.
- Estimate activity durations: The process of estimating the number of work periods needed to complete individual activities with estimated resources.
- Develop schedule: The process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model.

- Control schedule: The process of monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan.

Project Cost Management

The Knowledge Area include processes that required to ensure the project is completed within the approved budget. Here, costs for the project have to be calculated by developing an estimate of the costs for the resources needed to complete project activities and resources have to be planned, by determining what resources (people, equipment and materials) and what quantities of each are needed to perform project activities. It includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget (PMI, 2013).

- Plan cost management-The process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs.
- Estimate costs- The process of developing an approximation of the monetary resources needed to complete project activities.
- Determine budget-The process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.
- Control costs- The process of monitoring the status of the project to update the project costs and managing changes to the cost baseline.

Project Quality Management

According to PMI (2013) Project Quality Management includes the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken. Project Quality Management uses policies and procedures to implement, within the project's context, the organization's quality management system and, as appropriate, it supports continuous process improvement activities as undertaken on behalf of the performing organization. Project Quality Management works to ensure that the project requirements, including product requirements, are met and validated. There are three processes which need to be included in this Knowledge Areas.

- Plan quality management: The process of identifying quality requirements and/or standards for the project and its deliverables and documenting how the project will demonstrate compliance with quality requirements.
- Perform quality assurance: The process of auditing the quality requirements and the results from quality control measurements to ensure that appropriate quality standards and operational definitions are used.
- Control quality: The process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.

Project Human Resource Management

According to PMI (2013) Project Human Resource Management includes the processes that organize, manage, and lead the project team. The project team is comprised of the people with assigned roles and responsibilities for completing the project. Project team members may have varied skill sets, may be assigned full or part-time, and may be added or removed from the team as the project progresses. Project team members may also be referred to as the project's staff. Although specific roles and responsibilities for the project team members are assigned, the involvement of all team members in project planning and decision making is beneficial. Participation of team members during planning adds their expertise to the process and strengthens their commitment to the project. This project management Knowledge Area include the following four processes.

- Plan human resource management: The process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan.
- Acquire project team: The process of confirming human resource availability and obtaining the team necessary to complete project activities.
- Develop project team: The process of improving competencies, team member interaction, and overall team environment to enhance project performance.
- Manage project team: The process of tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.

Project Communications Management

Project Communications Management includes the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information. Project managers spend most of their time communicating with team members and other project stakeholders, whether they are internal (at all organizational levels) or external to the organization. Effective communication creates a bridge between diverse stakeholders who may have different cultural and organizational backgrounds, different levels of expertise, and different perspectives and interests, which impact or have an influence upon the project execution or outcome PMI (2013). According to PMI there are three processes under this knowledge area.

- Plan communications Management: the process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements, and available organizational assets.
- Manage communications: the process of creating, collecting, distributing, storing, retrieving and the ultimate disposition of project information in accordance with the communications management plan.
- Control communications: the process of monitoring and controlling communications throughout the entire project life cycle to ensure the information needs of the project stakeholders are met.

Project Risk Management

Project risk management deals with the processes of ensuring a proper risk identification, analysis and control during different phases of project. It enables the project team to take proactive responses and control the impact of risk events (PMI, 2013). The key components examined are risk management plan, risk identification and analyses, risk response plan and control risks.

- Plan risk management- The process of defining how to conduct risk management activities for a project.
- Identify risks-The process of determining which risks may affect the project and documenting their characteristics.

- Perform qualitative risk analysis-The process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact.
- Perform quantitative risk analysis-The process of numerically analyzing the effect of identified risks on overall project objectives.
- Plan risk responses-The process of developing options and actions to enhance opportunities and to reduce threats to project objectives.
- Control risks- The process of implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness throughout the project.

Project Procurement Management

This knowledge area deals with the processes involved in purchasing and acquiring the required resources from external suppliers. Procurement decisions depend upon the make or buy analyses in the initial phases of the project life cycle (PMI, 2013). The key components analyzed in this knowledge area are procurement management plan, procurement contract, controlling and closing procedures and documents.

- Plan Procurement Management-the process of documenting project procurement decisions, specifying the approach, and identifying potential sellers.
- Conduct Procurements-the process of obtaining seller responses, selecting a seller, and awarding a contract.
- Control Procurements-the process of managing procurement relationships, monitoring contract performance, and making changes and corrections as appropriate.
- Close Procurements-the process of completing each project procurement.

Project Stakeholder Management

Project stakeholder management deals with the processes of identifying and managing different stakeholders during different phases of project lifecycle. Stakeholders may have an impact on the project or the project may impact their concerns. These stakeholders are further used to create an effective communication plan as well (PMI, 2013). The key components analyzed are identifying stakeholders, management and engagement of stakeholders during different phases.

- Identify Stakeholders-The process of identifying the people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project; and analyzing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential impact on project success.
- Plan Stakeholder Management-The process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success.
- Manage Stakeholder Engagement-The process of communicating and working with stakeholders to meet their needs/expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle.
- Control Stakeholder Engagement-the process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders.

2.1.3 Project Management Maturity

The concept of "maturity" is being used increasingly to describe the state of an organization's effectiveness (Crawford, 2006). It can refer to a state where the organization is in a perfect condition to achieve its objectives. Project maturity would then mean that the organization is perfectly conditioned to deal with its projects (Andersen &Jessen, 2003). On the other hand, Kerzner, (2004) defined maturity in project management as the development of systems and processes that are repetitive in nature and provide a high probability that each project will be a success.

In a matured organization, a disciplined process is regularly followed, because all participants understand the value of doing so, and there is infrastructure and policy to support the process (Sarshar, Haigh, Finnemore, Aouad, Barrett, Baldry (2000). An immature organization, on the other hand, is an organization that does not have or use consistent and well-defined processes in the management of its projects (Sarshar et al., 2000). Such immature organization 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 to manage and control the project. Also, schedules and budgets are likely to be exceeded, and if deadlines are imposed, the quality of deliverables is liable to be compromised to meet the schedule.

2.1.4 Project Management Maturity Models (PMMM)

Maturity models are frameworks that are used to transform an organization from being less organized, less standardized and less documented into an organization achieving higher standards with greater consistency. They can also be used as a framework to guide improvement efforts of an organization (Jugdev & Thomas, 2002), (Cleland & Ireland, 2002), (Brookes, Butler, Dey & Clark, 2014). Ibbs and Kwak (2002) also described Project management maturity model (PMMM) as a model using which organization identifies its area of strength and weakness. Once these areas are identified then improvements are implemented to achieve excellence.

PMMM comprises of structured components for adaptation and implementation in organization. The components of PMMM include maturity levels, best practices for project management, assessment model for project management practices and process improvement plan. A typical approach for measuring project management maturity begins with measurement and assessment of existing project management practices. Next step involves benchmarking of measured maturity model with best practices standard of project management maturity. Benchmarking provides comparison of project management capabilities. Finally, project management capabilities are improved to higher levels of maturity (Jamaluddin, Chin and Lee, 2010).

2.1.5 Different Project Management Maturity Models

This section includes introduction and characteristics of the models that have received the greatest attention in the research literature (González, Marle & Bocquet, 2007). After introduction, criteria are established which is used to select most appropriate PMMM for carrying out research for this research.

Capability Maturity Model-CMM

Capability Maturity Model: Capability maturity model is the first maturity model to be developed. The model was developed by the software Engineering Institute at Carnegie Mellon University. The model was initially developed for use in improvement of software development processes. Later it was extended for use in other areas of systems, and software engineering and procurement. The model was primarily developed to evaluate software contractors' capability for contract award and administration purpose. Later the model has been used by software developers as a guide for the improvement of their processes (SEI, 2006). This model has served as a basis for the development of a number of maturity models in different fields including project management.

The CMM model has five maturity levels beginning from the initial stage (level 1), repeatable (level 2, Defined (level 3), managed (level 4) to the most matured level of optimizing (Level-5).

Project Management Process Maturity Model-(PM) [2]

The PM2 model is one of the pioneer PM maturity models developed. Like the CMM model, the PM2 model has five levels of maturity with slight difference in its use of terminologies. This model also have five levels starting from Ad-hoc (Level 1), planned (level 2), Managed at project level (level 3), Managed at corporate level (Level 4) and to the most matured continuous matured (level 5) ((Ibbs & Kwak, 2002).

PM Solutions Maturity Model

The Project Management Maturity Model (PMMM) is a formal tool developed by PM Solutions that seeks to measure the maturity in project management of an organization. Once the initial level of maturity and the areas for improvement have been identified, PMMM provides a roadmap, defining the necessary measures to be taken towards maturity in project management (PM Solution, 2014a). PMMM was first published in book form in 2002 and its second edition was released in 2007. It provides for five levels of evolutionary maturity and examines the development in ten knowledge areas of PMI's PMBOK guide. The objective of the PMMM methodology is to allow any organization to systematically and efficiently develop its project management capabilities (Crawford, 2007). This model similar with other maturity models have five levels.

Level 1: Initial Process - Not established practices or standards. Metrics and project documentation are informally collected.

Level 2: Structured Process and Standards - Basic metrics and project documentation are present but no organizational standard is set.

Level 3: Organizational Standards and Institutionalized Process - All projects use organizationally institutionalized formal standards.

Level 4: Managed Process - Metrics are used to manage projects and integrated into other corporate systems to maximize overall organizational performance.

Level 5: Optimizing Process - Lessons Learned is routinely studied to improve PM processes.

Kerzner's PM Maturity Model – K-PMMM

Harold Kerzner and the International Institute for Learning (IIL) view project management as a core competency that many companies must develop to remain competitive in the market. In this context, project management maturity models are important strategic tools for senior management allowing an organization to benchmark its capabilities in respect of project management. As such, a project management maturity assessment model is a tool for establishing project management excellence, which is considered a condition for success (Kerzner, 2002). Like (PM)2 and CMM, Kerzner's maturity model defines five levels by which an organization is ranked from insufficient project management processes to adequate project management processes leading to continuous improvement.

Organizational Project Management Maturity Model-OPM3

Organizational Project Management Maturity Model (OPM3) was first defined by PMI (Project Management Institute) in 1998. Organizational project management maturity model provides a framework that integrates project, program and portfolio management of organization for all the best practices. The integration defined by organizational project management includes (PMI-OPM3, 2013): Knowledge (of the portfolio, program, and project processes), Organizational strategy (mission, vision, objectives, and goals), People (having competent resources), and Processes (the application of the stages of process improvement). According to this model organizations may have high maturity level for project management practices but does not necessarily have to excel in portfolio or program management as well. The maturity of portfolio and program is measured against portfolio and program management practices. OPM3 provides flexibility in terms of organization's size and type, size and complexity of projects and geographical locations of projects (PMI-OPM3, 2013).

PMI-OPM3 (2013) has defined five maturity levels for performing maturity assessment of Project, Program or Portfolio Management either collective or individual. The use of maturity assessment is not compulsory in all the three areas to find improvement opportunity (PMI-OPM3, 2013). Description of maturity levels for OPM3 is explained below:

Level 1: None- No such practice exists

Level 2: Standardize - A standardized process of doing projects have been documented and communicated within organization. This practice is not used by all the projects but only few.

Level 3: Measure -Standardized process is used by all the projects within organization and processes are measured to evaluate effectiveness for organization.

Level 4: Control - Measured process is corrected for poor application of the standardized practice. Upper and lower limits are established, and process is analyzed.

Level 5: Improve- Continuous improvement of process becomes a practice for outcome of Best Practice standard.

2.1.6 Project Management Maturity Model Selection

The researcher tried to compile and review list of maturity models which have been developed so far by different organizations and individuals above. And made a comparison of maturity models to select most appropriate PMMM for carrying out research for this thesis used the criteria developed by Grant and Pennypacker in 2006. Grant and Pennypacker (2006) conducted a survey on project management maturity assessment. In this survey, questions about 42 components of project management maturity were asked to 126 participants from different organizations. Grant and Pennypacker (2006) used following criteria and others as depicted in table 2.1 below to select project management maturity model for their survey:

1 Scope covered by project maturity model,
2 Alignment of project maturity model with organization's project management methodology,
3 Ease and comfort ability to use

Table 2:1 Comparison of Project Management Maturity models

Criterion	**PM solution**	**OPM3**	**CMM**	**K-PMMM**
Publisher	PM Solutions Inc	PMI	SEI	ILL
Scope	PM	PM	Software	PM
Maturity level	1-5	1-5	1-5	1-5
Refer to Standard	PMBOK	PMBOK	-	PMBOK
Project Management process	Yes	Yes	Yes	Yes
Program Management process	No	Yes	Yes	No
Portfolio Management Process	No	Yes	No	NO

Assessment difficulty	Low	Low	High	Low
Assessment Cost	Low	Low	High	Low
Quantitative Results	Yes	Yes	Unknown	Yes
Tangible of results	Yes	Yes	Yes	Yes
Identifying weakness and strengths	Yes	Yes	Yes	Yes
Continuous Assessment	Yes	Yes	Yes	Yes
Training Difficulty	Low	Low	High	Medium
Commitment for Continuous improvement	Yes	Yes	Yes	Yes
Suggestion of Alternative for improvement	Yes	Yes	Yes	Yes
Priority of improvement	Medium	Medium	Medium	Medium
Easy for Execution	Yes	Yes	Yes	Yes
Simple and Understandable	Yes	Yes	Medium	Yes

Source: Adopted from Khoshgoftar and Osman, 2009 and PM Solutions 2014

From table 2.1 above PM Solution's model and OPM3 models are almost the same except in their areas of focusing or covering in assessing the level of maturity. According to Špundak (2010) The PM solution's model has focus only on project management without taking into consideration other organizational aspects such as program or portfolio management. The OPM3 model focus not only in projects but also in program and portfolio management which is beyond the scope of this research.

Thus, as this research focuses on assessing the level of project management maturity in managing projects in Ethio-Telecom rather than programs and portfolios, the researcher selected the Project Management Maturity Model (PMMM) that was presented by PM Solutions to assess the level of project management maturity and the level maturity across each project management knowledge areas of Ethio-Telecom. And some of the model's characteristics make it ideal for use in the current study are also; This model is based on the ten knowledge areas of the PMBOK® Guide as shown figure 2.1 below, which is related with the objectives of the researcher and it also used the structure

of the SEI Capability Maturity Model. The indicated assessment method is not very cumbersome and can easily be used to determine organizations' current level of project management maturity.

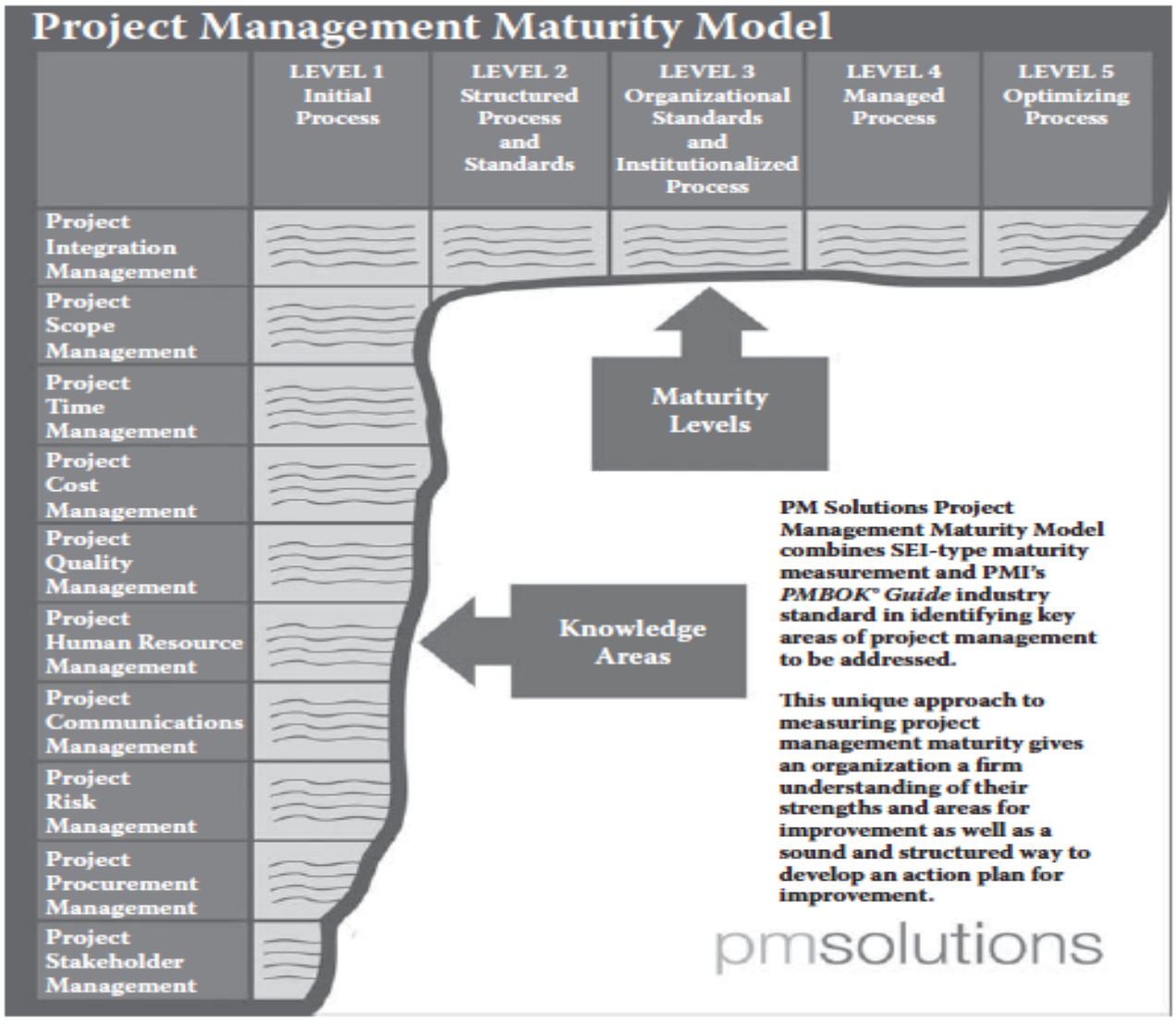

Figure 2:1 PM Solutions' Project Management Maturity Model

Source: Crawford (2015)

2.2 Empirical Review

Yen, Peng and Gee (2016) set out to research on a case study assessment of project management maturity level in the Malaysia's industry. Their aim was to create a general overview and raise awareness among the SMEs in the Malaysian IT organizations regarding the importance of assessing project management maturity level as a means of continuous improvement. The research

confirmed that the indicator index level of project management maturity can be benchmarked by IT project managers to define (with some reasonable degree of accuracy) what constitutes project successes and project failures, what are the direct and indirect contributing factors as key performance indicators (i.e. best practices) for project management maturity; in the best interest of both the company as well as the project (i.e. customer).

Abadir (2011) set out to research on the maturity of project management in the construction industry in developing countries with a bias towards Ethiopia, whose aim was to identify problem areas to be prioritized and propose a framework for improvement efforts. He used primary data collection method to assess the maturity model that could be utilized for the assessment purpose. Further, he also studied to see if there is a difference in PM maturity, between different categories of contractors except for Material and Equipment Management knowledge areas. The research confirmed that knowledge areas of material, procurement; cost, time, financial and human resource management had shown comparatively higher maturity, compared with other PM knowledge areas. The research also showed on average the contractor's PM process maturity is at an informal level and, their PM practice maturity is at a basic level. This result meant on average the contractors performed the knowledge areas informally without following structured approach or guidelines, relying solely on the skills and experience of the project manager or project team; and on average, the contractors were performing only the basic practices in each knowledge area. Further to this, he confirmed that construction PM maturity of contractors who are ISO certified or in a process of obtaining ISO certification was higher, when compared to those who are neither ISO certified nor in the process to get the certification.

According to Spalek (2014) research on the 'Assessing project management maturity in the area of knowledge management in select companies', using the PMM model, which measured maturity in four areas: methods and tools, human resources, project environment and knowledge management focused on the machinery industry, The results from the article show that, irrespective of the country of origin of the company, the lowest maturity levels in the knowledge management area were noticed in the machinery industry (1.59). Then, the maturity level increases slightly in construction (2.35) firms. Nearly 99% of construction companies reported the initial (1st) or standardized (2nd) level of maturity, while all foreign ones were at the standardized (2nd) or appliance (3rd) level.

According to Hartman (2008) research on 'Project management maturity' aimed to address the issue of project management maturity and how it may be modelled. The research report indicated that the Maturity of project management helps us understand several things like the competence of the organization with current trends and in the self-assessment of the key factors in the organization. Hartman suggests that construction contractors are the key persons for the success and development of the industry.

Mullaly and Thomas (2010) conduct a study to assess project management maturity level in Indonesian businesses may bring insight about current business practices, which is important to speed up country development and business sustainability. Adapting the Project Management Maturity Model (ProMMM), a survey instrument has been developed and applied to professionals from Jakarta and surrounding area. The result of analysis shows that construction and primary industry have a higher maturity level compare to manufacturing and services. It is to be noted, however, that the level of project management understanding is low across industries. Mullaly & Thomas point out that there seems to be a relationship between maturity and performance, but that no statistically significant correlations exist to prove it. This indicates 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.

According to Ibbs and Kwak (2011) in their research 'Assessing project management maturity' by summarizes the results of research conducted by investigators in assessment of project management maturity aid to determine the financial and organizational impacts of Project Management (PM). The study showed that the PM Maturity assessment for all companies averaged 3.26 on a relative scale of 1 (lowest) to 5 (highest). Overall the Engineering-Construction (EC) industry had the highest score, and the Information Systems (IS) application area had the lowest.

Ofori and Deffor (2013) set out to assess the Project Management Maturity in Africa (Ghana). They utilized a survey methodology approach for data collection. Primarily, the findings showed that there are differences in the current project management maturity levels across each phase of the project lifecycle for all organizations. Among the categories of groups, the result further revealed that NGOs exhibited a relatively higher level of maturity compared to the other types in all the five phases of the project management lifecycle. Secondly, the study established that public sector organizations' in Ghana have inadequate levels of maturity in a majority of phases of the

project management lifecycle. This finding perhaps shows the low level of project management expertise among public sector organizations in Ghana. In overall, the result seemed to indicate that project management maturity occurs in phases i.e., PMM does not occur as an event but an ongoing process that is interlinked. There is necessity, therefore, for project implementing organizations in Ghana to endeavor to attain maturity in the entire project management lifecycle.

Pawar, Deshmukh and Chavan (2016) set out to assess the maturity of PM in the construction industry of developing countries (India). The research proposed a PM maturity model to address the gaps and adapted it to the developing countries context. Maturity assessment of contractors in India was undertaken using the proposed maturity model and, low level of PM maturity; which indicated the informal practice of the fundamental processes was in existence. Further, the research found ISO certified contractors' have a higher project management maturity level than those who are not certified. Similarly, Capacity Building Program was found to positively impact on the degree of project management maturity, because contractors who participated have a greater maturity level than those who did not participate. Likewise, Road Contractors PM maturity is comparatively higher than Building contractors. Furthermore, the research found higher maturity level for cost, material, procurement, financial, time, and human resource management. Risk and safety management were found to be the least matured PM areas.

2.2.1 Critique of Existing Literature Relevant to the Study

Several types of researchers have done substantial work on this topic around the world and few studies related to construction companies have been done in Ethiopia, but there has been no research on the subject in the Ethiotelecom company context specifically.

2.3 Conceptual Framework

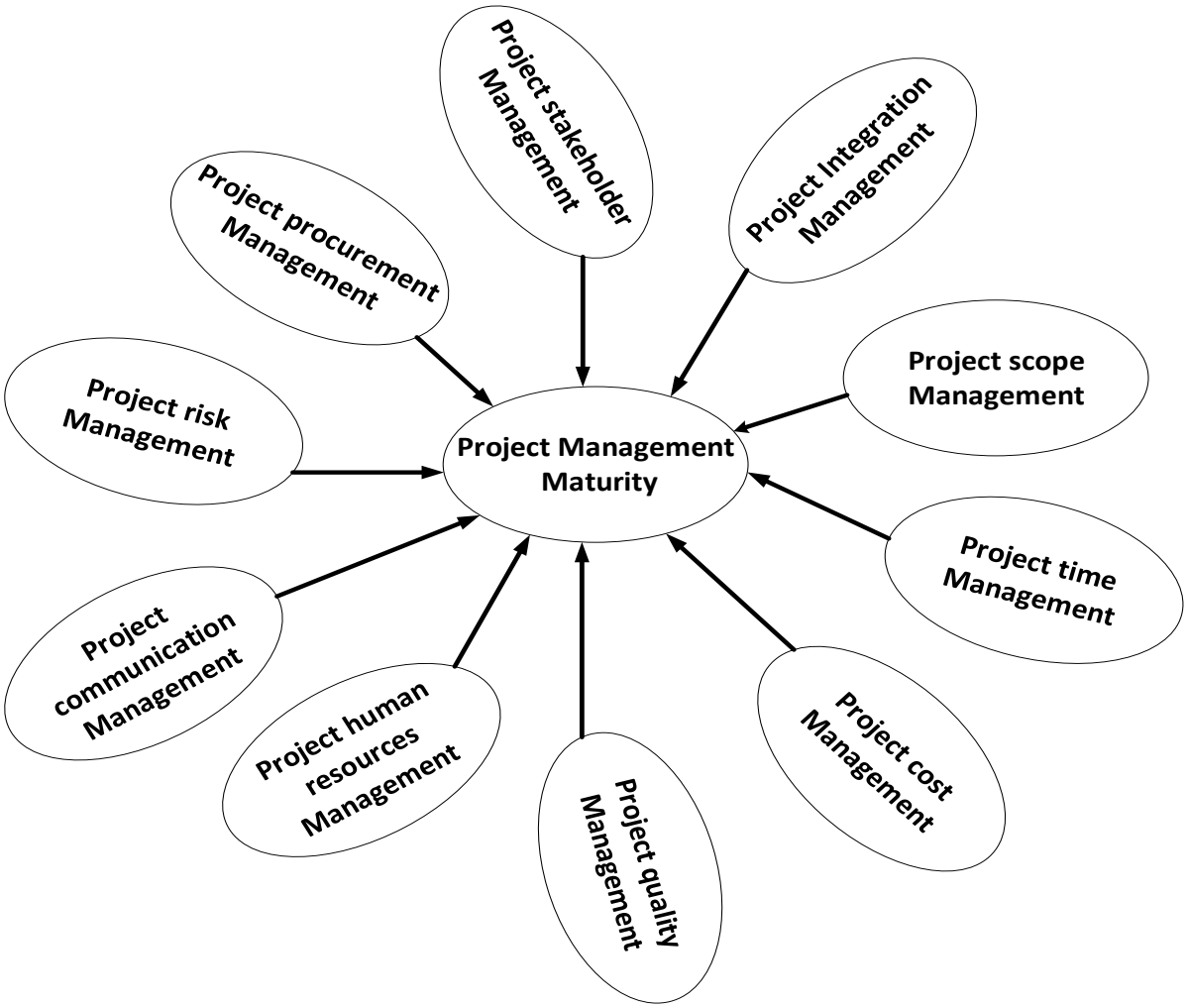

Figure 2:2 Project management conceptual framework

Source: Own researcher based on the PMBOK 5th edition

Project management is being embraced, to some extent, by most organizations as the best way to develop and deliver new or improved products, services, and organizational process changes (Cleland & Ireland, 2002). This research used ten Project management body of knowledge areas mainstreamed PM solutions model to assess the maturity level of the organization. Those are Project integration management, scope, quality, time; cost, Procurement, Human resource, communication and risk management. Based on maturity level of each knowledge area the final maturity level was then determined as an average of the ten knowledge areas.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

According to Adams, Khan, Raeside and White (2007) research design is the blueprint for fulfilling research objectives and answering research questions. In other words, it is a master plan specifying the methods and procedures for collecting and analyzing the needed information. According to Kothari (2004) the major purpose of descriptive research, as the term implies, is to describe characteristics of a population or phenomenon. Descriptive research seeks to determine the answers to *who, what, when, where,* and *how* questions but not why questions. The researcher adopted a descriptive survey research design for the study as the study conducted to answer questions of what is the level of project management maturity of the company in managing its projects. What is level of maturity across each of the project management knowledge areas? And to describe them against the characteristics of the level of maturity of PM Solutions model.

3.2 Research Approach/Method

To assess the level of project management maturity of the company in managing its projects the researcher used quantitative and qualitative data approaches. Qualitative approaches helped to interpret the research data and describe the actual project management practice. Quantitative approach helped to present the data in a tabular form, and compute mean and percentage. Hence, the mixed method research approach to inquiry is used since in involves philosophical assumptions, and mixing of both approaches in tandem with in a single study so that the overall strength of the study is greater than either qualitative or quantitative research (Creswell, 2009)

3.3 Target Population

According to Dawson (2002) the first step in the process of sampling is specifying the population of the study. Population or universe refers to any collection of specified group of cases to be studied. The population needs to be properly defined so that there is no ambiguity as to whether a given unit belongs to the population. On the other hand, if a population is not properly defined, a researcher faces a difficulty in knowing what units to consider when selecting the sample. Furthermore, inferences concerning a population cannot be drawn in the absence of clearly defined population. The intended population of this study was employees in the TEP project office who

are directly participating in the implementation of the different TEP projects, these are program managers, project managers, project specialist/coordinators and project professionals.

After defining the population of interest for a given study, it is quite necessary to prepare the list of names of all items of the universe. The complete list of the members of a population is known as sampling frame or source list. The complete list should be comprehensive, correct, reliable and appropriate. It is essential for the source list to be representative of the universe as possible (Dawson). Since the TEP projects kicked off in January 2013, the office has a list of employees who has participated in the implementation of the TEP projects a sample frame from all list of employees was analyzed. After defining a population and preparing a sample frame, a researcher selects a sample of units from the source list by using appropriate techniques. The process of such selection is known as sampling. A good sample must be as nearly representative of the entire population as possible and ideally it must provide the whole of information about the population from which the sample has been drawn.

According to Saunders, Lewis, and Thornhill (2009 the size of sample should be optimum, which is neither excessively large nor too small. An optimum or adequate sample is one which fulfils the requirements of efficiency, representativeness, reliability and flexibility. *In this research* sample size was determined by adopting the Curry (1984), Professor of Educational Research's "rule of thumb" on sample size determination as shown in table 3.1 below.

Table 3:1 Curry's "Rule of Thumb" on Sample Size Determination

"Rule of Thumb"	Range of Population Size(N)	Sample Size as a Percentage of Population(S)
RT-1	The larger the population size, the smaller the percentage of the population required to get a representative sample	
RT-2	0-100	100%
RT-3	101 – 1000	10%
RT-4	1001 – 5000	5%
RT-5	5001 – 10000	3%
RT-6	Above 10000	1%

(Source: Curry, 1984)

From the target populations of the TEP staffs 1050 in number (Ethiotelecom TEP projects staff list 2018), a 5% of the target population was taken as a research sample according to the Rule of Thumb number 4 (RT-4), hence, the researcher settled on a sample size of **53** for the study. And 53 questionnaire booklets are distributed to the respondents.

3.4 Sampling Technique and Sample Size

The sampling frame segregated the population into various subgroups. A stratified random sampling technique was used to select random samples from the homogenous subgroup of role-based categories to assure representation of the different job roles within the population in the study sample as depicted in table 3.2 below. A total of 53 employees were analyzed, the sample size included 1 program manager, 4 project manager, 24 project specialist/ coordinator and 24 project professionals. The respondents will be selected from the subgroups by using a simple random.

Table 3:2 Target population role-based stratification and sample from each stratification

TEP Role	**ET Head Count Status (Population) (N)**	**Sample size (n) n_1= (N1/N) *sample size**
Program Manager	14	1
Project Manager	67	4
Project Specialist/Coordinator	483	24
Project Professional	486	24
Universe Total	**1050**	**53**

Source: Ethio-Telecom TEP projects staff list 2018

3.5 Data Collection Methods and Procedures

To collect data the researcher used mainly a 1 to 5-point Likert Scale questionnaire format, with a 1 being the lowest level of PM Maturity and a 5 being the highest level were distributed to randomly selected telecom expansion projects staffs. These questionnaires were adopted from

Sukhoo, Barnard, Eloff and Poll (2005) developed using PM Solutions' project management maturity assessment. These types of questionnaire format are a common tool to collect data for assessing project management maturity of a company and researchers such as Sukhoo, Barnard, Eloff and Van der, (2005), Ibbs and Kwak (2002), Beset (2007) and Girma (2015) used this tool in conducting study on the maturity assessment. The distribution was done in person and email to the respondents; that was collected back within five days' time with an average return rate of 88.68%. The researcher tried to clarify the questionnaire to the participants by face to face discussion and making calls.

In addition to the questionnaire the researcher used interview with four project managers to get farther qualitative information from project managers regarding the actual practices in managing the projects. The interview was held with the project managers that were selected using the stratified sampling. Interviewed project managers of the company in the telecom expansion projects has been names as "Project manager 1 (PM 1)" and "Project manager 2 (PM2), project manager 3 (PM3) and Project manager 4 (PM4) to keep the confidentiality of the project managers. During the interviews, a set of complied questions with brief background for conducting the research study was presented to the respondents and the researcher also used document review to select maturity models for assessing the level of maturity in managing TEP projects and to compare the computed results of the company with the characteristics of the selected maturity model standards.

3.6 Data Analysis and Presentation

According to Mosby (2009), data analysis is the process of coding, classifying and tabulating information required to perform quantitative or qualitative analysis according to the research design and appropriate to the data. The researcher carefully examined the collected raw data to detect errors and omissions and to correct these when possible and assigned numerals to answers that enable to put responses into a limited number of categories. In calculating the level of project management maturity of the company all knowledge areas were given equal weight and also in calculating maturity level of each knowledge areas, all processes under each of the knowledge areas were given equal weight (Pawar, Deshmukh & Chavan, 2016). In this research data analysis was done using descriptive statistics using Statistical Package for Social Sciences (SPSS) 20 and

Microsoft Excel version 2013. The results obtained from the analysis was presented in graphs and based on which concrete conclusions and recommendations are forwarded.

3.7 Ethical Issues and Considerations

In this study ethical consideration was applied by maintaining confidentiality of information about the organization and respondents. In addition to this, the gathered data were only used for this study, not used for other purpose, or not transferred to other party. Furthermore, the respondents were ordered not to write any information like their name and other personal code while responding to the questionnaire.

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

4.1 Response Rate

A total of 53 questionnaire copies were administered, of which 47 were fully completed representing 88.68% response rate. Despite several follow ups 11.32% failed to respond. Response rate refers to the number of subjects sampled in a study who respond to the research instruments. A response rate of 50% was deemed adequate for analysis and reporting, response rate of 60% was good and a response rate of 70% and over was considered very good (Mugenda & Mugenda, 2003). The study returned a very good response rate at 88.68% and was considered adequate for analysis and reporting.

4.2 General information of the respondents

For the general questions regarding position/role, project working experience, company experience and level of education are presented here under.

4.2.1 Position/role at TEP Projects of the Respondents

Table 4.1 portrays the roles of the respondents' project specialist/expert role play at 23 (48.9%), project professionals 19 (40%) and project managers 4(8.5%) respectively. This indicated that the more information is collected from each role regarding to the assessment of project management maturity level.

Table 4:1 Position/role at TEP projects of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	program manager	1	2.1	2.1	2.1
	project manager	4	8.5	8.5	10.6
	project specialist	23	48.9	48.9	59.6
	project professional	19	40.4	40.4	100.0
	Total	47	100.0	100.0	

(Source: own survey results, 2018)

4.2.2 Project Working Experience of Respondents

Table 4:2 Project working experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	7	14.9	14.9	14.9
	6-10	25	53.2	53.2	68.1
	11-15	12	25.5	25.5	93.6
	above 15	3	6.4	6.4	100.0
	Total	47	100.0	100.0	

(Source: own survey results, 2018)

Table 4.2 indicates that respondents have significant levels of project management experience. The details show that about 53.2 percent of the respondents have 6-10 years of project experience. Some (25.5) percent indicates their project experience was between 11-15 years and (15) percent indicated their project experience was between 1-5 years with a few of the respondents indicating they have project management experience above fifteen (15) years. This shows that majority of the respondents had between 6 to 10 years of project experience in the company which in turn points that they are quite experienced to the project implementation.

4.2.3 Company Working Experience of Respondents

Table 4:3 Company working Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6-10	13	27.7	27.7	27.7
	11-15	24	51.1	51.1	78.7
	above 15	10	21.3	21.3	100.0
	Total	47	100.0	100.0	

(Source: own survey results, 2018)

In addition to the related project work experience in the company, respondents were requested to fill for how long they worked in Ethio telecom and resulted were analyzed as distributed in table 4.3. Accordingly, only 27.7% (13) worked between 6-10years, 51 % (24) of them had between

11-15 years of experience, while 21.3 % (10) of them had worked for above 15 years. Here, it's clear that most of the respondents have a work experience for above 11 years in the Ethiotelecom and it shows that they had enough time to well know their company's trends and standards especially about project management maturity.

4.2.4 Education Level of Respondents

The findings regarding to the education level of the respondents as presented in Table 4.4 below shows that most of the respondents (81%) indicated they had a "Bachelors" degree. On the other hand, some (19) percent of the respondents indicates a master's Degree as their level of education.

Table 4:3 Respondents level of education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor	38	80.9	80.9	80.9
	Master	9	19.1	19.1	100.0
	Total	47	100.0	100.0	

(Source: own survey results, 2018)

4.3 Answers to research questions

In this section, the answers to research questions the study planned to answer have been addressed by using the data acquired.

4.3.1 What is the Level of Maturity with Respect to Each of the Project Management Knowledge Areas?

One of the objectives of this study set out to answer was, knowing what is the level of maturity with respect to each of the project management knowledge areas? This was done by asking respondents to level the PMBOK's 5th edition project management processes as per the actual company's level of project management maturity perspective under each of the knowledge areas as Level 1, level 2, level 3, level 4, level 5 based on the given clarification of each maturity level derived from the Project management solutions, Inc model. In calculating maturity level of each knowledge areas, all processes under each of the knowledge areas were given equal weight (Pawar, Deshmukh & Chavan, 2016).

4.3.1.1 Maturity Level of Project Integration Management Knowledge Area

Project Integration management knowledge area includes the processes and activities needed to identify, define, combine, unify and coordinate the various processes and project management activities within the project management process groups. In the project management context, integration includes characteristics of unification, consolidation, articulation and integrative actions that are crucial to project completion, successfully managing stakeholder expectations and meeting requirements.

Table 4.5 below depicts that there are six processes for measuring and labeling project integration management maturity. The results for project integration management indicates that processes such as direct and manage project work, monitoring and controlling as well as close project or phase of the project integration management knowledge areas have almost similar results which are approximately at maturity level 2 and they are the least matured in the project integration management knowledge areas. And the processes of develop project charter and perform integrated change control process are the highly matured processes rated at maturity level 3. The four project managers (PM1, PM2, PM3 and PM4) mentioned during the interview session projects are consistently started with the defined project charter, and there is a defined and documented change control process for scope changes, but all project processes management is not applied to all projects.

Table 4.5 below indicates the average maturity level of the company in project integration management knowledge areas in managing it projects is rated averagely at 2.38 approximately at level 2. And it is on progress to reach the next level 3.

This level 2 in project maturity indicates that there are basic, documented processes in place for developing project plans and integrating, analyzing, and developing the report on work results. Summary – level information is consolidated into reports. The focus is on summary status and performance reporting for the triple constraint items (scope, time, and cost). Although the processes are in place, they are not considered an organizational standard (Crawford, 2002).

Table 4:4 Project integration Management maturity level

Maturity levels (% of 47 respondents)						
Project Integration Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Developing Project charter		12.8	72.3	14.9		3.02
Project Plan Development		40.4	55.3	4.3		2.64
Direct and Manage Project Work	23	61.7	14.9			1.91
Monitor and control Project Work	23	61.7	14.9			1.91
Integrated Change Control		23.4	61.7	14.9		2.85
Closing a Project or Phase		23.4	61.7	14.9		1.94
Project Integration Management Maturity level						**2.38**

(Source: own survey results, 2018)

4.3.1.2 Maturity Level of Project Scope Management Knowledge Area

Project scope management consists of the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Maturity level of this knowledge area is measured in terms of the five processes as shown in table 4.6 below. The maturity level of this knowledge area is rated at 2.36 approximately level 2 maturity level. The result table also indicates that the maturity level result of each process in this knowledge area is similar with the average maturity level of the knowledge area.

Table 4:5 Project scope management maturity level

Maturity levels (% of 47 respondents)						
Project Scope Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Plan Scope Management	6.4	44.7	48.9			2.43
Collect requirements.	13	48.9	34	4.3		2.3
Define Scope	8.5	48.9	40.4	2.1		2.36
Create WBS	13	53.2	34			2.21
Validate Scope	4.3	57.4	38.3			2.34
Control Scope	2.1	51.1	42.6	4.3		2.49
Project Scope Management Maturity level						**2.36**

(Source: own survey results, 2018)

According Crawford (2002) this level 2 project management maturity indicates that these processes are existed in the company in implementing its projects, but they are not considered an organizational standard.

In the interview conducted with project manager 1 (PM1), project manager 2 (PM2), project manager 3(PM3) and project manager 4 (PM4) it was found out that there is a documented process by which the project manager solicits and receives inputs and develops project requirements and key deliverables were identified and listed and describing the scope statements, which was enforced by organizational management for larger, more visible projects. Projects were consistently prepared in accordance with the defined process and format. The company used expert judgment (consultant), meeting and focus group discussion. Regrading to scope change control process there is a defined and documented scope change control process, but not all of the projects follow this process.

4.3.1.3 Maturity Level of Project Time Management Knowledge Area

Project time management knowledge areas includes the processes required to manage the timely completion of the project. Which includes the process of establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule, the process of identifying and documenting the specific actions to be performed to produce the project deliverables, the process of identifying and documenting relationships among the project activities, the process of estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity, the process of estimating the number of work periods needed to complete individual activities with estimated resources, the process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model and finally it includes the process of monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan.

As shown in table 4.7 project time management knowledge area maturity level is averages at 2.01. This level 2 (Structured Process and Standards) project time management maturity is characterized by there are basic, documented processes in place for identifying project activities, sequencing the activities and establishing dependencies, developing summary schedules, publishing and distributing reports, and monitoring basic schedule metrics. Basic metrics exist for schedule information (milestone percent complete) although they are collected and correlated manually. Management support project management process but they are only consistently involved on large, visible projects.

There project managers PM2, PM3 and PM4 mentioned that they did not use milestone and Gant char documents as the company could not provide documents on how to develop their respective project milestone. But they used MS-excel tool for time management process. And, the baseline schedule for most of the projects did not maintained. The planned schedule of the project is available for all project teams via the company email. PM1 among the four project managers indicates that he used a structured document to develop his own project milestone developed by himself.

Table 4:6 Project Time Management maturity level

Maturity levels (% of 47 respondents)						
Project Time Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Plan Schedule Management	4.3	66	29.8			2.26
Activity definition	17	70.2	12.8			1.96
Activity Sequencing	23.4	57.4	19.1			1.96
Estimate Activity resources	27.7	59.6	12.8			1.85
Activity Duration Estimating	19.1	66	14.9			1.96
Schedule Development	27.7	46.8	25.5			1.98
Schedule Control	10.6	66	23.4			2.13
Project Time Management Maturity level						**2.014**

(Source: own survey results, 2018)

4.3.1.4 Maturity of Project Cost Management

Project cost management includes the processes involved in estimating, budgeting and controlling costs so that the project can be completed within the approved budget. Project cost management includes the processes of: Estimate costs, Determine Budget and Control Cost.

Table 4.8 below indicates that project cost management knowledge area maturity of the company in managing its projects is found to be 2.01 (Structured Process and Standards) maturity level. According to the interview conducted with the project managers most of them mentioned that there are documented processes in place for identifying generic key resources (labor categories, hours, equipment, and material), generating and documenting project cost estimates, publishing and distributing reports, and monitoring basic metrics. Although the processes are in place, they are not considered an organizational standard. A basic cost-estimating template exists. Metrics exist

for basic cost information (planned budget, percent complete) although they may be collected and correlated manually.

Table 4:7 Project Cost Management maturity level

Maturity levels (% of 47 respondents)						
Project Cost Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Plan cost Management	10.6	57.4	29.8	2.1		2.23
Cost Estimating	27.7	55.3	17			1.89
Determine Budget	17	68.1	14.9			1.98
Cost Control	21.3	63.8	14.9			1.94
Project Cost Management Maturity level						**2.01**

(Source: own survey results, 2018)

PM1, PM2, PM3 and PM 4 also confirmed that the company did not use the modern project management software and earned value management systems/ tools to manage the project cost. But currently the company is introducing Enterprise Resource Planning (ERP) systems to manage and tracking each project costs and the company has a practice of assigning costs based the project size before the project is kicked off and all the project scope changes and cost estimates resulted from the scope change is approved by the management of the company.

4.3.1.5 Maturity of Project Quality Management

Project quality management includes the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the processes: plan quality, perform quality assurance and perform quality control. Its main purpose is to satisfy the client, to conform to requirements, to ensure fitness to requirements and to ensure if the design is fit for customers.

Table 4:8 Project Quality Management maturity level

Maturity levels (% of 47 respondents)						
Project Quality Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Plan Quality Management	12.8	40.4	40.4	4.3	2.1	2.43
Perform Quality Assurance	8.5	44.7	38.3	8.5		2.47
Quality Control	6.4	42.6	40.4	10.6		2.55
Project Quality Management Maturity level						**2.48**

(Source: own survey results, 2018)

Maturity level of project quality management knowledge area of the organization is found to be 2.46 level (structured process and standards) approximately at level 2 from the five-maturity level of PM solutions model as depicted in table 4.9 above. This level 2 in maturity level is characterized by a basic organizational quality policy has been adopted and management encourages the use of it on large and highly visible projects.

According to the interview result with project managers PM1, PM2 and PM4 mentioned that there is a basic approach for quality assurance and the company used different project documents and quality management and control tools as well as different preliminary acceptance tests to manage the project quality. And PM3 also strongly argued that the company assures the quality of the project if the test result is more than 95% fit.

4.3.1.6 Maturity of Project Human Resource Management

Project Human Resource Management includes the processes that organize, manage, and lead the project team. The project team is comprised of the people with assigned roles and responsibilities for completing the project. It is measured using the processes of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan , confirming human resource availability and obtaining the team necessary to

complete project activities, improving competencies, team member interaction, and overall team environment to enhance project performance and tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.

As table 4.7 below shows the computed average mean of the processes is 2.70 approximately this knowledge area is at maturity level 3. This is computed from the average result of four processes under this knowledge area. Thus, processes under this project management knowledge area have not a difference in the level of maturity. Almost all the processes have equal level of maturity approximately 3.

Table 4:9 Project Human Resource Management maturity level

Maturity levels (% of 47 respondents)						
Project HR Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Plan HR Management.	2.1	42.6	53.2	2.1		2.55
Acquire Project team		31.9	59.6	8.5		2.77
Develop Project team		27.7	61.7	10.6		2.83
Manage Project team		38.3	59.6	2.1		2.64
Project HR Management Maturity level						**2.70**

(Source: own survey results, 2018)

From the interview result with the four project managers (PM1, PM2 PM3 and PM4) confirmed that project management practices and processes are consistent across projects and the company used organizational charts and position description to plan human resource of each project depending on the size and importance of the project. The company gave project management training to the project team members before and during implementation of the project and the company has a defined roles and responsibilities for all project members.

4.3.1.7 Maturity of project Communication Management

Project Communications Management includes the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information. Project managers spend

most of their time communicating with team members and other project stakeholders, whether they are internal (at all organizational levels) or external to the organization. Effective communication creates a bridge between diverse stakeholders who may have different cultural and organizational backgrounds, different levels of expertise, and different perspectives and interests, which impact or have an influence upon the project execution or outcome.

Table 4:10 Project Communication Management maturity level

Maturity levels (% of 47 respondents)						
Project communications Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Plan communications Management	8.5	61.7	27.7	2.1		2.23
Manage communications	19.1	53.2	27.7			2.09
Control communications	25.5	31.9	34	8.5		2.26
Project Communications Management Maturity level						**2.19**

(Source: own survey results, 2018)

The table 4.11 above shows that the company is at maturity level 2 in project communication management knowledge area. The processes in this knowledge area have almost equal level of maturity.

From the collected interview result with the four project managers: project manager 1 (PM1), project manager 2 (PM2), project manager 3 (PM3) and project manager 4 (PM4) there is an established basic communications management processes whereby stakeholder communication needs, and project constraints and assumptions are identified, project status and progress reporting are distributed on a regular basis, and there is a notification of phase and overall project completion. But these processes were not standardized processes. The company uses communication technology tools such as email, phone calls as well as different consistent meetings in managing the projects. PM1, PM2 and PM4 did not share lessons learned with project members

as they were busy with different project management meetings. And, final reports, lessons learned, and previous experiences are not well organized, documented and utilized for other projects. But PM 3 shared project lessons learned with his own project members after every project milestone is delivered.

4.3.1.8 Maturity of Project Risk Management

Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project. The objectives of project risk management are to increase the probability and/or impact of positive risks and to decrease the probability and/or impact of negative risks, in order to optimize the chances of project success.

Table 4:11 Project Risk Management maturity level

Maturity levels (% of 47 respondents)						
Project Risk Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Plan risk Management		27.7	63.8	8.5		2.81
Identify risks		31.9	57.4	8.5	2.1	2.81
Perform Qualitative risk Analysis		14.9	63.8	21.3		3.06
Perform Quantitative risk Analysis		21.3	68.1	8.5	2.1	2.91
Risk Response Planning		27.7	59.6	12.8		2.85
Control risks		51.1	46.8	2.1		2.51
Project Risk Management Maturity level						**2.83**

(Source: own survey results, 2018)

Almost more than half the respondents rated each of the process in this knowledge is approximately at level 3 as depicted table 4.12 above. This shows that the average risk

management maturity of this knowledge is found to be approximately at level 3. This is highest matured project management knowledge area next to project procurement knowledge area and all of the processes in this knowledge area have also a maturity level 3.

PM1, PM2, PM3 and PM4 project managers mentioned that the risk processes in the organization are standardized throughout the organization and are being utilized by nearly all projects and the organization has a documented, repeatable process for identifying project risks, which is fully implemented. Documentation is existing on all process and standards for identifying risk events. A process is fully developed and utilized for managing and controlling risk in the company. Project risks are actively, routinely tracked. Corrective actions are taken place and/ or things change, and project plans are adjusted accordingly.

4.3.1.9 Maturity of Project Procurement Management

Procurement management is the processes and actions undertaken by the project manager and/or team to acquire goods and services in support of the project. It also includes activities in managing the contract throughout the period of performance and closing the contract upon completion. All these process and actions must be taken within the constraints of the organizational structure and polices of the overall organization. Generally, the process involves contracting with an outside vendor to acquire goods and services in a timely manner, in the appropriate quantity, and within a defined quality standard. It includes the processes: Plan Procurements, Conduct Procurement, control procurement, and Close Procurement.

From table 4.13, we can see that majority of the respondents rated these processes also above the maturity level 3 and the mean of the table also shows 3.37. This indicates that the overall maturity level of this project procurement management maturity level of the organization is found to be approximately at level 3.

From the four project managers PM1, PM2, PM3 and PM4 interview result the company has implemented Enterprise Resource Planning (ERP) systems to standardized the procurement process of the projects in the company and all procurement are processed using this systems and procurement. The sourcing procedure document review of the company indicates that the company has a well written formal working producers and formats for procurement works and they are standardized throughout the organization and applied to all projects. All procurement In addition

to this the sourcing and facility of the division takes a lead on procurement planning requisitioning of project procurement items.

Table 4:12 Project Procurement management maturity level

Maturity levels (% of 47 respondents)						
Project Procurement Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Plan Procurement Management			48.9	44.7	6.4	3.57
Conduct Procurements			48.9	46.8	4.3	3.55
Control Procurements		6.4	51.1	42.6		3.36
Close Procurements		6.4	51.1	42.6		3
Project Procurement Management Maturity level						**3.37**

(Source: own survey results, 2018)

4.3.1.10 Maturity of Project Stakeholder Management

Project Stakeholder Management knowledge area includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project, to analyze stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution. This knowledge area also focuses on continuous communication with stakeholders to understand their needs and expectations, addressing issues as they occur, managing conflicting interests and fostering appropriate stakeholder engagement in project decisions and activities.

Table 4.14 shows that the maturity level of project stakeholder management knowledge area is 2 level of maturity. No one of the processes in this knowledge areas reached at level 3 project management maturity. This figure indicates that processes in this knowledge areas are not yet standardized throughout the organization and all projects don’t follow these processes.

Table 4:13 Project stakeholder management maturity level

Maturity levels (% of 47 respondents)						
Project stakeholder Management Knowledge Area	**1**	**2**	**3**	**4**	**5**	**Mean (Maturity Level)**
Identify Stakeholders	19.1	53.2	27.7			2.09
Plan stakeholder Management	4.3	53.2	40.4	2.1		2.4
Manage Stakeholder Engagement	10.6	42.6	46.8			2.36
Control Stakeholder Engagement	12.8	48.9	38.3			2.26
Project stakeholder Management Maturity level						**2.28**

(Source: own survey results, 2018)

Project manager 1 (PM1), project manager 2 (PM2), project manager 3 (PM3) and project manager 4 (PM4) argued that there is a stakeholder management process required to identify the people, groups or organizations that could impact or be impacted by the project. Three project managers project manager 1, project manager 2 and project manager 3 mentioned that project stakeholder management tools such as stakeholder analysis, expert judgement and meeting were implemented in the organization. But they are not standardized throughout the organization that means all projects did not follow these processes consistently.

4.3.2 What is Overall Project Management Maturity Level of the Company in managing its Projects?

Table 4:14 Project management maturity level of the company in managing its projects

Maturity level of each Project Management Knowledge Areas	**Mean (PMM Level)**
Project Integration Management Maturity	2.38
Project Scope Management Maturity	2.36
Project Time Management Maturity	2.01
Project Cost Management Maturity	2.01
Project Quality Management Maturity	2.48
Project HR Management Maturity	2.70
Project Communications Management	2.2
Project Risk Management Maturity	2.8
Project Procurement Management Maturity	3.37
Project stakeholder Management Maturity	2.28
Overall Project management maturity level	**2.46**

(Source: own survey results, 2018)

Table 4.15 shows the results of current PMM of the company in managing its projects. The overall maturity level is 2.46 (i.e., Structured Process and Standards process according to PM solution's maturity model) which is an indication of a maturing PM processes in the organization. This research finding is similar with the research finding of Pennypacker and Grant (2003 & 2006). They conducted a project management maturity research on 126 companies to find out the project management maturity level among companies using the proprietary PM Solutions Project Management Maturity Model, which combines SEI Capability Maturity Model with nine Knowledge Areas of the *PMBOK® Guide*, resulting in a five-level maturity model. They found that overall, most of the companies (53%) achieved relatively low level 2 (structured process and standards), while 19% and 14% achieved level 3 and level 1 accordingly. The rest of respondents placed their companies on level 4 or level 5. And, a research by Špundak and Štriga (2010) on project management maturity of Croatian companies found the same result maturity level of the 79 participating companies.

In general, it is noted that PMM of the company is moving from Level 2 to Level 3. As PMM moves to Level 3 it also means that the organization should strive for having all project management processes are in place and established as organizational standards. Nearly all projects use this process with minimal exception. Management has institutionalized the processes and standards with formal documentation existing on all process and standards. Project management processes are typically automated, and management is regularly involved in input and decision making. Each project is evaluated and managed considering other projects.

4.3.3 Which Project Management Knowledge Area are Highly Matured and Least Matured in Managing Its Projects?

Regarding the research objectives of the highly matured and least matured project management knowledge areas in the company in managing its projects is depicted as shown in figure 4.1.

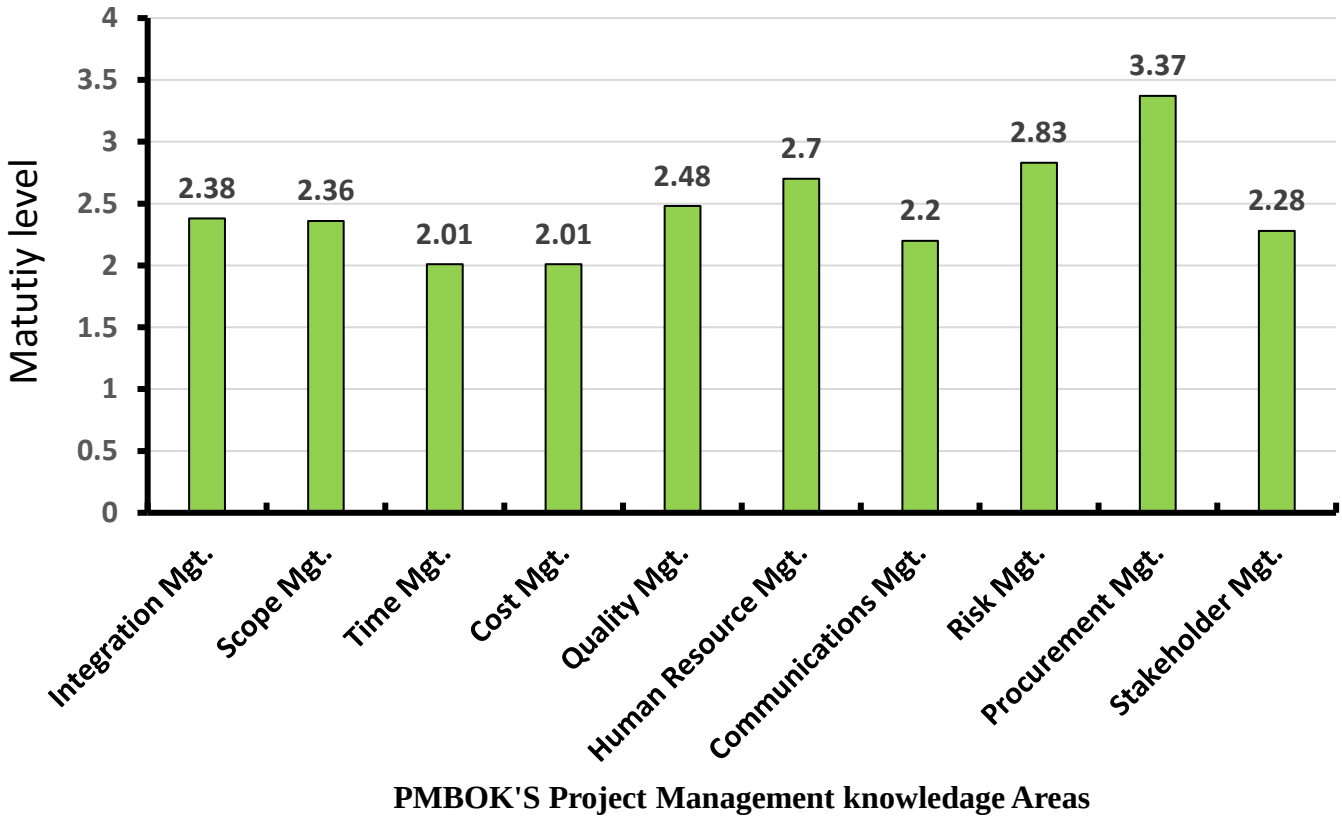

Figure 4:1 highly matured and less matured project knowledge areas

As the figure 4.1 above shows project procumbent, project risk management and project human resource knowledge areas with a mean of 3.37, 2.83 and 2.70 respectively out of 1 to5 maturity levels tend to be comparatively more mature than the other project management knowledge areas. The project managers PM1, PM2, PM3 and PM4 indicates as the company has implemented ERP system to automate not only the procurement process but other process such as Human Resource process made these project management knowledge areas highly matured relative to other project management knowledge areas.

Project time management and project cost management with a mean score of 2.01 out of 1 to 5 levels each in the organizations are shown as being least matured project management knowledge areas. From the figure 4.1 above the maturity level of project cost management and time management or the triple project constraints or core project management knowledge area have equal level of maturity. This indicates that the process in each of these knowledge area are not standardized.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Research Findings

Generally, the objective of this study was to assess the level of project management maturity of the organization. Specifically, to assess the level of maturity across each of the project management knowledge area and assess the low matured and highly matured project management knowledge areas. Assessing the project management maturity benefits the organization to improve its effectiveness in project delivery and it allows the organization to diagnosis the current position in the maturity level and identifies improvement areas. As a result, it provides a path forward for the organization in improving project management practices and to establish well defined organizational standards for project management.

To sum up the findings according to 'five level maturity' the overall project management maturity level of the company in managing its projects is at maturity level 2.46 approximately 2 and maturity level of each of the knowledge area are summarized in figure 5.1.

Project procurement management, project risk management and project human resource knowledge areas maturity level of the company are relatively higher than the rest of knowledge areas and they are approximately at maturity level 3.

Project cost management and project time management knowledge areas maturity level of the company are relatively lower than the rest of other knowledge areas and they are at maturity level 2.

Project stakeholder management, project quality management, integration management and scope management have maturity level greater than 2.2.

Finally, none of the ten project management knowledge areas, nor any of their processes, is rated at a maturity level of 5.

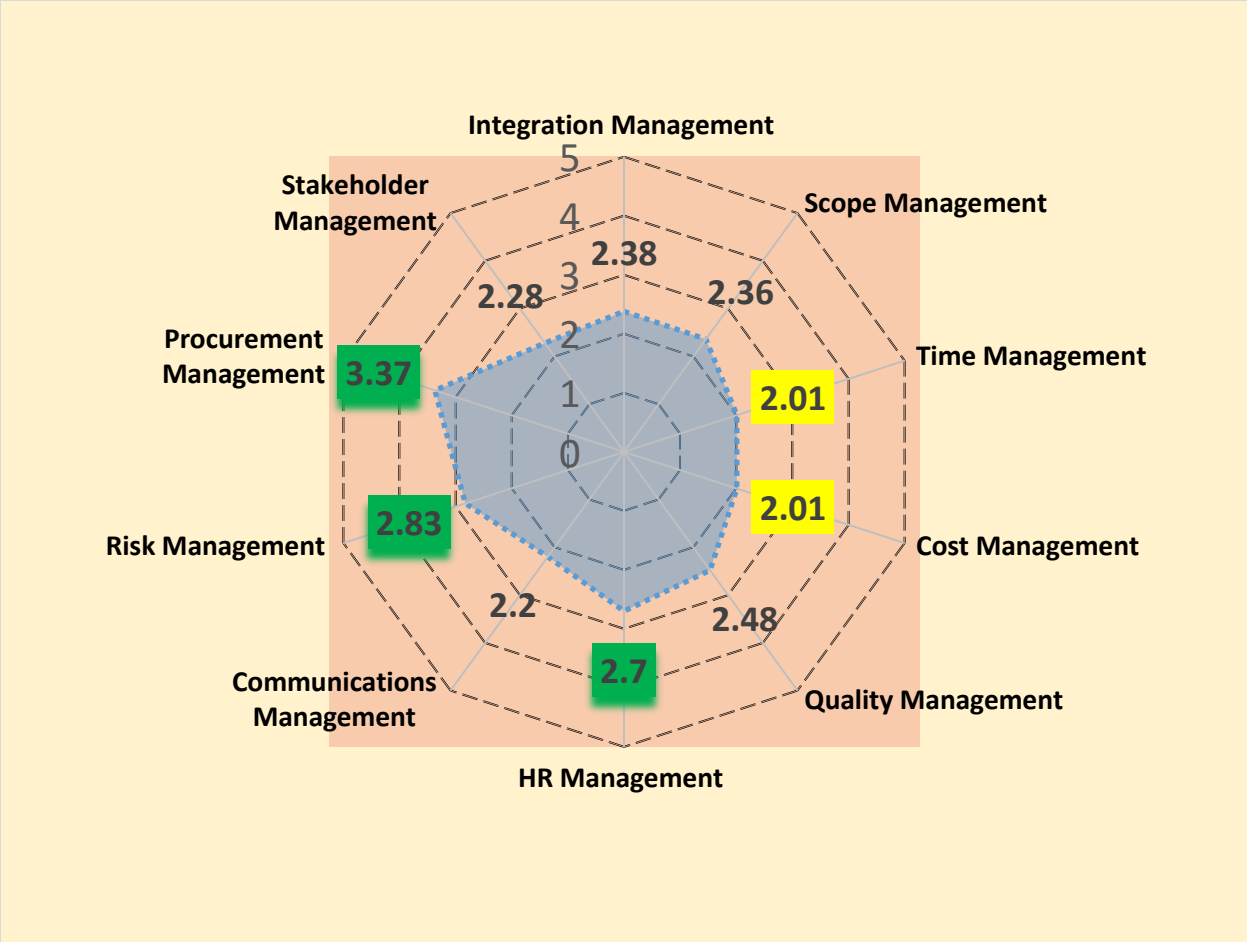

Figure 5:1 Project management maturity level across each of the Knowledge areas

(Source: own survey result, 2018)

5.2 Conclusion

Following are the conclusions which have been drawn from this study:

Many project management knowledge area processes exist in the organization, but they are not considered an organizational standard yet. Documentation exists on these basic processes. Management supports the implementation of project management, but there is neither consistent understanding, involvement, nor organizational mandate to comply for all projects. There are basic metrics to track cost, schedule, and technical performance collected/ correlated using the ERP system of the company.

The company has all project procurement, project risk and project human resource knowledge area processes in place and established as organizational standards. Nearly all projects use these process

with minimal exception. The procurement process is considered an organizational standard, and is used by nearly all projects. The procurement of the company is run with a much more program-view that is, management views other projects and products in the program is making their decisions. The project team and purchasing department are fully integrated in the procurement process.

Related to the project risk management knowledge area processes they are considered an organizational standard and are being utilized by nearly all projects. The risk identification process is expanded to include efficient ways for teams to identify risks (e.g., checklists). The risk quantification process is expanded to identify more advanced procedures for quantifying risks and multiple criteria to prioritize risk items. The risk response development process is enhanced with templates. All processes are repeatable. But a risk control system is not yet developed and established in the company. Metrics are collected and analyzed, such as the types of risks and success rate in mitigating the items.

The company has a documented processes in place for identifying generic key resources (labor categories, hours, equipment, and material), generating and documenting project cost estimates, publishing and distributing reports, and monitoring basic cost metrics. Although the processes are in place, they are not considered an organizational standard. A basic cost- estimating template exists. Metrics exist for basic cost information (planned budget, percent complete) and collected and correlated using ERP project management system. And also the company has basic, documented processes in place for identifying project activities, sequencing the activities and establishing dependencies, developing summary schedules, publishing and distributing reports, and monitoring basic schedule metrics. Although the processes are place, they are not considered an organizational standard.

Finally PMM of the company is moving from Level 2 to Level 3 and the organizations is striving for having all project management processes are in place and established as organizational standards. Nearly all projects use this process with minimal exception. Management has institutionalized the processes and standards with formal documentation existing on all process and standards. Project management processes are typically automated and management is regularly involved in input and decision making. Each project is evaluated and managed in light of other projects.

5.3 Recommendation

The following recommendations are divided into two sections. The first section presents a set of recommendations to increase the level of project management maturity and its project implementation as there is a link exists between project management maturity and project success((Schiltz,2003 & Sonnekus & Labuschagne,2004), The second section offers a set of recommendations providing suggestions for future researchers in exceeding the scope of this study.

5.3.1 Recommendations for Improving Level of Maturity

The findings of this study shows that the organization is at level 2 (structured process and standards) and moving to Level 3(organizational standards and institutionalized process) which indicates that many project management knowledge area processes exist in the organization, but they are not considered an organizational standard and to make all these project management processes an organizational standards and institutionalized process the organization will need to apply the following proposed recommendations;

Give special attention to the least matured knowledge area i.e. Project time management and project cost management knowledge areas as they are part of the triple constraint of a project. The company should introduce different systems/ tools such as project management software and earned value management for planning, estimating and budgeting as these are the tools used to increase and standardize maturity level of these project management knowledge areas.

Strengthen the already established project management office. This office helps in standardized project related governance processes and facilitates the sharing of resources, methodologies, tools and techniques (PMI, 2013)

Provide project management training based on project management knowledge areas including organizational standards, and processes of project management, for the project team and others. This can increase the ability to implement all the standards and processes to all projects easily and will increase project deliverables.

Conduct periodic assessments be performed on an annual basis to ensure improvements are taking root. Essentially, repeated assessments (commonly referred to as re-assessments) can be used to track progress against the project management deployment plan that would be developed as a result of the initial assessment.

To establish Project Management Information Systems for its projects either through an already established project office or on individual projects.

5.3.2 Recommendations for Future Research

Although this study assessed the level of project management maturity of the company and found the company is at level 2.46 in project management maturity which indicates many project management knowledge area processes exist in the organization, but they are not considered an organizational standard. This indicates that there is room for further research to conduct on the root causes or factors associated to this low level of project management maturity of the company and the least matured and highly matured project management knowledge areas which are not covered by the researcher in this study due to time constraint.

Conducting a reassessment research after some years later to determine if there is any improvement in managing of its projects and if the organization has shown also improvement in level of maturity after this study.

Furthermore, the researcher suggest that following the global interest, future research in this area should be also focused on the question of what value project management brings to the company.

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APPENDIX A: QUESTIONNAIRE

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

MASTERS OF ART IN PROJECT MANAGEMENT

Dear Participant;

My name is Gebrewahd Hadgu. I am an MA student in project management at Addis Ababa University School of Commerce. As part and parcel of my MA in project management, I am studying **ASSESSING THE LEVEL OF PROJECT MANAGEMENT MATURITY IN THE CASE OF ETHIO TELECOM.**

I kindly request you to participate in this study by patiently completing the questionnaires. And, I hereby assure you that all the information will remain confidential and do not include your name in the questionnaires.

Besides, I sincerely request you to respond to the questions as per the actual company's level of project management maturity perspective, not the general perspective. And, as honestly as possible.

The results of this research will contribute greatly in determining the current level of maturity of the organization in managing its projects and where the organization needs to go to the next level of maturity for further improvement and success of projects within the organization. Therefore it is yours genuine response which drives to effective analysis and conclusion then fruitful recommendations

Needless to say, that your time is invaluable, please take few minutes of your precious time to complete the following questionnaires.

If you have any hesitation or question,

Email: gwahdh@gamil.com or gwahdh@yahoo.com

Tel: +251911510377

Thank you very much for your time and kind cooperation!!

Gebrewahd Hadgu

April, 2018

Addis Ababa, Ethiopia

General instruction and information

Dear participant, this questionnaire booklet has two parts:

Part I – asks respondents profile such as position / role in the project, years worked as project manager or project expert/member.

Part-II- asks respondents to level the project management process under each of the 10 knowledge areas as **Level 1, l**evel 2, level 3, level 4, level 5 based on the given clarification of each maturity level derived from the Project management solutions, Inc.

Part I: General Information of respondent: tick (√) on the respective boxes

1. Position/role at the project

Program manager ☐ **Project manager** ☐

Project specialist ☐ **Project professional** ☐

2.**Years of working experience as project manager / project expert/project specialist/ professional**

Below 1 ☐ **1-5** ☐ **6-10** ☐ **11-15** ☐ **above 15** ☐

3. **Years of working experience in the company**

Below 1 ☐ **1-5** ☐ **6-10** ☐ **11-15** ☐ **above 15** ☐

4. Your highest level of education

high school ☐ **bachelor** ☐ **master** ☐ **PhD** ☐

Part II: Main Questions on the level of project management maturity of the company in managing its projects

Please consider the following definitions carefully before completing the below questionnaire. The following definitions are referred to the maturity levels according to **PM solution's model.**

Maturity Level 1 - Initial Process

- **Processes** - No established practices and standards.
- **Documentation** - Loose and ad-hoc.
- **Management** - Management understands the definition of a project, and is aware of the need for project management.
- **Metrics** - Collected informally on an ad-hoc basis.

Maturity Level 2 - Structured Process and Standards

- **Processes** - Processes exist, but are not considered an organizational standard.
- **Documentation** - Documentation exists on the basic processes.
- **Management** - Management supports the implementation of project management, but understanding and involvement is not consistent / applied to all projects. Large projects are executed in a systematic fashion, and management is involved in such projects.
- **Metrics** - Basic metrics to track cost, schedule and technical performance exist.

Maturity Level 3 - Organizational Standards and Institutionalized Process

- **Processes** - All project management processes are in place and established as organizational standards. These processes involve the clients as members of the project team. Nearly all projects use these processes.
- **Documentation** - Documentation exists on all the processes.
- **Management** - Management is regularly involved in input and approval of key decisions.
- **Metrics** - Metrics are formally collected and each project is evaluated and managed in light of other projects.

Maturity Level 4 - Managed Process

- **Processes** - project management processes, standards and supporting systems are integrated with other corporate processes and systems.

- **Documentation** - Processes and standards are documented to support using metrics to make project decisions.
- **Management** - Management understands its role in the project management process. There are different management styles and project management requirements for different projects.
- **Metrics** - Efficiency and effectiveness metrics are used. All projects, changes and issues are evaluated based upon metrics from cost estimates, baseline estimates, and earned value calculations.

Maturity Level 5 - Optimizing Process

- **Processes** - Processes are in place and actively used to improve project management activities.
- **Documentation** - Lessons learned are regularly examined and used to improve project management processes, standards and documentation.
- **Management** - Management is focused not only on effectively managing projects but also on continuous improvement.
- **Metrics** - The metrics collected during project execution are used to understand the performance of a project and to assist in the making of organizational management decisions for the future.

Please rate each of the following project management process or statements according to the maturity levels on the above explanation for each of the maturity level, by making an √ in the appropriate box.

Note:

1= Maturity Level 1 - Initial Process

2= Maturity Level 2 - Structured Process and Standards

3= Maturity Level 3 - Organizational Standards and Institutionalized Process

4= Maturity Level 4 - Managed Process

5= Maturity Level 5 - Optimizing Process

PMBOK's ten project management Knowledge Areas	**Ascending maturity level from 1 up to 5**				
1. Project Integration Management	1	2	3	4	5
Developing a document that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities.					
Defining, preparing, and coordinating all subsidiary plans and integrating them into a comprehensive project management plan.					
Leading and performing the work defined in the project management plan and implementing approved changes to achieve the project's objective.					
Tracking, reviewing, and reporting project progress against the performance objectives defined in the project management plan.					
Coordinating changes across the entire project					
Finalizing all activities across all of the Project Management Process Groups to formally complete the phase or project.					
2. Project Scope Management	1	2	3	4	5
Creating a scope management plan that documents how the project scope will be defined, validated, and controlled					
Determining, documenting, and managing stakeholder needs and requirements to meet project objectives.					

Developing a detailed description of the project and product.					
Subdividing project deliverables and project work into smaller, more manageable components					
Formalizing acceptance of the completed project deliverables.					
Monitoring the status of the project and product scope and managing changes to the scope baseline					
3. Project Time Management	**1**	**2**	**3**	**4**	**5**
Establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.					
Identifying the specific activities that must be performed to produce various project deliverables					
Identifying and documenting relationships among the project activities.					
Estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity.					
Estimating the number of work periods needed to complete individual activities with estimated resources.					
Analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model.					
Monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan.					
4. Project Cost Management	**1**	**2**	**3**	**4**	**5**
Establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs.					
Developing an approximation of the monetary resources needed to complete project activities.					
Aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.					
Monitoring the status of the project to update the project costs and managing changes to the cost baseline					
5. Project Quality Management	1	2	3	4	5

Identifying quality requirements and/or standards for the project and its deliverables and documenting how the project will demonstrate compliance with quality requirements.					
Auditing the quality requirements and the results from quality control measurements to ensure that appropriate quality standards and operational definitions are used					
Monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.					
6. Project Human Resource Management	**1**	**2**	**3**	**4**	**5**
Identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan.					
Confirming human resource availability and obtaining the team necessary to complete project activities.					
Improving competencies, team member interaction, and overall team environment to enhance project performance					
Tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.					
7. Project Communications Management	**1**	**2**	**3**	**4**	**5**
Developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements, and available organizational assets.					
Creating, collecting, distributing, storing, retrieving and the ultimate disposition of project information in accordance with the communications management plan					
Monitoring and controlling communications throughout the entire project life cycle to ensure the information needs of the project stakeholders are met.					
8. Project Risk Management	**1**	**2**	**3**	**4**	**5**
Deciding how to approach and plan the risk management activities for a project.					
Determining which risks might affect the project and documenting their characteristics.					

Prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact					
Numerically analyzing the effect of identified risks on overall project objectives					
Developing options and actions to enhance opportunities and to reduce threats to project objectives					
Implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness throughout the project.					
9. Project Procurement Management	**1**	**2**	**3**	**4**	**5**
Documenting project procurement decisions, specifying the approach, and identifying potential sellers.					
Obtaining seller responses, selecting a seller, and awarding a contract.					
Managing procurement relationships, monitoring contract performance, and making changes and corrections as appropriate.					
Completing each project procurement.					

10. Project stakeholder Management	**1**	**2**	**3**	**4**	**5**
Identifying the stakeholders that could impact or be impacted by a decision, activity, or outcome of the project; and analyzing and documenting relevant information.					
Developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success.					
Communicating and working with stakeholders to meet their needs/expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle.					
Monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders.					

Thank you for your cooperation to fill out this questionnaire!

APPENDIX B: INTERVIEW QUESTIONS:

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

MASTERS OF ART IN PROJECT MANAGEMENT

Dear project managers;

My name is Gebrewahd Hadgu. I am an MA student in project management at Addis Ababa University School of Commerce. As part and parcel of my MA in project management, I am studying **ASSESSING THE LEVEL OF PROJECT MANAGEMENT MATURITY IN THE CASE OF ETHIO TELECOM.**

I kindly request you to participate in this study by patiently giving answers for the following list of interview questions. And, I hereby assure you that all the information will remain confidential. Besides, I sincerely request you to respond to the interview questions as per the actual company's project management practices, not the general perspective. And, as honestly as possible. The results of this research will contribute greatly in determining the current level of maturity of the organization in managing its projects and where the organization needs to go to the next level of maturity for further improvement and success of projects within the organization. Therefore it is yours genuine response which drives to effective analysis and conclusion then fruitful recommendations

Needless to say, that your time is invaluable, please take few minutes of your precious time to complete the following interview questions.

If you have any hesitation or question,

Email: gwahdh@gamil.com or gwahdh@yahoo.com

Tel: +251911510377

Thank you very much for your time and kind cooperation!!

Gebrewahd Hadgu

May 2018

Addis Ababa, Ethiopia

Interview Questions

No.	Project integration management
1	Are all the projects executed in professional manner within planned time and cost?
2	Do you use the project charter?
3	Does the overall change controls manage actual changes when they occur?
4	Who has responsibility in project planning, execution, and control? And approved by whom?
5	Does all project process management apply to all projects?

No.	Project Scope management
1	Do you use all the scope management processes and apply to projects? such as • Collect requirements • Define scope • Create WBS • Verify scope • Control scope
2	Do you provide standard scope management documents for customers?
3	How is scope of project determined? • Direction from management? • Developed from functional targets? • Direction from customers**?** • Other, if so describe
4	How is scope changed and controlled? • Direction from management? • Direction from customers? • Change notice form project office? • Other, if so describe

No.	Project Time management
1	What type of documents do you use for time management? • Milestone plans • Project plans - Gantt chart • System plans • Master schedule plan • Other, if so describe
2	What type of tools/ techniques do you use for time management process? • Project management software • MS Excel • List of tasks • Other, if so describe
3	Is the baseline schedule maintained for each projects?
4	Is the planned schedule available for all project teams via web or email?

No.	Project cost management
1	What systems / tools do you currently use to manage your project cost? Is standard method practiced for resource planning, cost estimation and budgeting? Yes /No • Project management software • MS Excel • Earned Value Management / Forecasting • Other, if so describe
2	How are project costs assigned? • By project • By tasks and time • By department • WBS • Other, if so describe
3	What method do you use for tracking costs? Is there a built system for cost tracking?Yes/No • Central database • Project manager maintains a spreadsheet • Project engineers' spreadsheet • Other, if so describe
4	Are scope changes and cost estimates approved by management?

No.	Project quality management
1	Is there software based systems / tools that you currently use to manage your project quality? • Quality management and control tools • Seven Basic Quality Tools • Quality metrics and audits • Process analysis • Project documents • Not applicable
2	Are quality goals methods and systems established for each project?
3	Are quality assurances processes established and recognized by your organization?
4	Are there performance/quality standards used to identify and measure project's product quality?

No.	Project HR management
1	Are your project management practices and process consistent across divisions and functional groups?
2	What systems / tools do you currently use to plan HR management in your projects? • Organization charts and position descriptions • Networking • Organizational theory • Expert judgment • Meetings • Other, if so describe

3	Are PM training courses identified and training provided?
4	Do you have defined roles and responsibilities for all project members?
5	Do you have a defined skill level for project manager?

No.	Project Communications management
1	What kind of techniques and tools do you use to plan communications? • Communication requirements analysis • Communication technology • Communication models and methods • Meetings • Other, if so describe
2	Does project manager share lessons learned with project members?
3	Are final reports, lessons learned and previous experiences well organized, documented and utilized for other projects?

No.	Project risk management
1	When is project risk analyzed? • Before all field exploration • After every project phase • After accomplishing every key event • After reaching every milestone • After every progress evaluations • Other, if so describe
2	Are the areas of risk identified and mitigated for each project?
3	Is there a defined process to measure deliverables?
4	What methods or tools do you use to manage and control risk? • Monte Carlo analysis • Decision tree analysis • Scenario analysis • Gantt charts • SWOT analysis • Other, if so describe
5	Are there standard documents provided of risk management for project members and customers?
6	Is the risk analysis done for each project?

No.	Project Procurement management
1	Is there a written formal working procedure and format for procurement works?
2	Is the procurement management process applied to all projects?
3	Does the procurement department take lead on planning, requisitioning items?

No.	Project Stakeholder management
1	Is there a stakeholder management process required to identify the people, groups or organizations that could impact or be impacted by the project?
2	What tools do you use to identify stakeholders in your project? • Stakeholder analysis - • Expert judgment • Meetings • Other, if so describe
3	Is the relevant information available for all identified stakeholders?
4	Who has a responsibility to plan, manage, control, and make decisions in stakeholder management process? • Division Chief executive officers • Department officers • Project Manager • Project teams • Other, if so describe

========== **The End** ==========

Thanks

APPENDIX C: SPSS OUTPUTS

Project Integration Management Knowledge Area

		Develop Project Charter	Develop Project Management Plan	Direct and Manage Project Work	Monitor and Control Project Work	Perform Integrated Change Control	Close Project or Phase
N	Valid	47	47	47	47	47	47
	Missing	0	0	0	0	0	0
Mean		3.02	2.64	1.91	1.91	2.85	1.94
Median		3.00	3.00	2.00	2.00	3.00	2.00
Mode		3	3	2	2	3	2
Std. Deviation		.531	.568	.620	.654	.625	.673
Variance		.282	.323	.384	.427	.390	.452
Minimum		2	2	1	1	2	1
Maximum		4	4	3	3	4	3

Develop Project Charter

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	6	12.8	12.8	12.8
	maturity level 3	34	72.3	72.3	85.1
	maturity level 4	7	14.9	14.9	100.0
	Total	47	100.0	100.0	

Develop Project Management Plan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	19	40.4	40.4	40.4
	maturity level 3	26	55.3	55.3	95.7

	maturity level 4	2	4.3	4.3	100.0
	Total	47	100.0	100.0	

Direct and Manage Project Work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	11	23.4	23.4	23.4
	maturity level 2	29	61.7	61.7	85.1
	maturity level 3	7	14.9	14.9	100.0
	Total	47	100.0	100.0	

Monitor and Control Project Work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	12	25.5	25.5	25.5
	maturity level 2	27	57.4	57.4	83.0
	maturity level 3	8	17.0	17.0	100.0
	Total	47	100.0	100.0	

Perform Integrated Change Control

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	maturity level 2	13	27.7	27.7	27.7
	maturity level 3	28	59.6	59.6	87.2
	maturity level 4	6	12.8	12.8	100.0
	Total	47	100.0	100.0	

Close Project or Phase

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	12	25.5	25.5	25.5
	maturity level 2	26	55.3	55.3	80.9
	maturity level 3	9	19.1	19.1	100.0
	Total	47	100.0	100.0	

Project scope Management knowledge area

		Plan Scope Management	Collect Requirements	Define Scope	Create WBS	Validate Scope	Control Scope
N	Valid	47	47	47	47	47	47
	Missing	0	0	0	0	0	0
Mean		2.43	2.30	2.36	2.21	2.34	2.49
Median		2.00	2.00	2.00	2.00	2.00	2.00
Mode		3	2	2	2	2	2
Std. Deviation		.617	.749	.673	.657	.562	.621
Variance		.380	.562	.453	.432	.316	.386
Minimum		1	1	1	1	1	1
Maximum		3	4	4	3	3	4

Plan Scope Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	3	6.4	6.4	6.4
	maturity level 2	21	44.7	44.7	51.1
	maturity level 3	23	48.9	48.9	100.0
	Total	47	100.0	100.0	

Collect Requirements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	6	12.8	12.8	12.8
	maturity level 2	23	48.9	48.9	61.7
	maturity level 3	16	34.0	34.0	95.7
	maturity level 4	2	4.3	4.3	100.0
	Total	47	100.0	100.0	

Define Scope

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	4	8.5	8.5	8.5

	maturity level 2	23	48.9	48.9	57.4
	maturity level 3	19	40.4	40.4	97.9
	maturity level 4	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Create WBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	6	12.8	12.8	12.8
	maturity level 2	25	53.2	53.2	66.0
	maturity level 3	16	34.0	34.0	100.0
	Total	47	100.0	100.0	

Validate Scope

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	2	4.3	4.3	4.3
	maturity level 2	27	57.4	57.4	61.7
	maturity level 3	18	38.3	38.3	100.0

	Total	47	100.0	100.0	

Control Scope

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	1	2.1	2.1	2.1
	maturity level 2	24	51.1	51.1	53.2
	maturity level 3	20	42.6	42.6	95.7
	maturity level 4	2	4.3	4.3	100.0
	Total	47	100.0	100.0	

Project time Management Knowledge area

	Plan Schedule Management	Define Activities	Sequence Activities	Estimate Activity Resources	Estimate Activity Durations	Develop Schedule	Control Schedule
Valid	47	47	47	47	47	47	47
Missing	0	0	0	0	0	0	0
Mean	2.26	1.96	1.96	1.85	1.96	1.98	2.13
Median	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Mode	2	2	2	2	2	2	2
Std. Deviation	.530	.550	.658	.625	.588	.737	.575
Variance	.281	.302	.433	.390	.346	.543	.331
Minimum	1	1	1	1	1	1	1
Maximum	3	3	3	3	3	3	3

Plan Schedule Management

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	maturity level 1	2	4.3	4.3	4.3
	maturity level 2	31	66.0	66.0	70.2
	maturity level 3	14	29.8	29.8	100.0
	Total	47	100.0	100.0	

Define Activities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	8	17.0	17.0	17.0
	maturity level 2	33	70.2	70.2	87.2
	maturity level 3	6	12.8	12.8	100.0
	Total	47	100.0	100.0	

Sequence Activities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	11	23.4	23.4	23.4
	maturity level 2	27	57.4	57.4	80.9
	maturity level 3	9	19.1	19.1	100.0
	Total	47	100.0	100.0	

Estimate Activity Resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	13	27.7	27.7	27.7
	maturity level 2	28	59.6	59.6	87.2
	maturity level 3	6	12.8	12.8	100.0
	Total	47	100.0	100.0	

Estimate Activity Durations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	9	19.1	19.1	19.1
	maturity level 2	31	66.0	66.0	85.1
	maturity level 3	7	14.9	14.9	100.0
	Total	47	100.0	100.0	

Develop Schedule

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	13	27.7	27.7	27.7

	maturity level 2	22	46.8	46.8	74.5
	maturity level 3	12	25.5	25.5	100.0
	Total	47	100.0	100.0	

Control Schedule

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	5	10.6	10.6	10.6
	maturity level 2	31	66.0	66.0	76.6
	maturity level 3	11	23.4	23.4	100.0
	Total	47	100.0	100.0	

Project cost management Knowledge area

		Plan Cost Management	Estimate Costs	Determine Budget	Control Costs
N	Valid	47	47	47	47
	Missing	0	0	0	0
Mean		2.23	1.89	1.98	1.94
Median		2.00	2.00	2.00	2.00
Mode		2	2	2	2
Std. Deviation		.666	.667	.571	.604
Variance		.444	.445	.326	.365
Minimum		1	1	1	1
Maximum		4	3	3	3

Plan Cost Management

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	maturity level 1	5	10.6	10.6	10.6
	maturity level 2	27	57.4	57.4	68.1
	maturity level 3	14	29.8	29.8	97.9
	maturity level 4	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Estimate Costs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	13	27.7	27.7	27.7
	maturity level 2	26	55.3	55.3	83.0
	maturity level 3	8	17.0	17.0	100.0
	Total	47	100.0	100.0	

Determine Budget

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	8	17.0	17.0	17.0
	maturity level 2	32	68.1	68.1	85.1

	maturity level 3	7	14.9	14.9	100.0
	Total	47	100.0	100.0	

Control Costs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	10	21.3	21.3	21.3
	maturity level 2	30	63.8	63.8	85.1
	maturity level 3	7	14.9	14.9	100.0
	Total	47	100.0	100.0	

Project quality management Knowledge area

		Plan Quality Management	Perform Quality Assurance	Control Quality
N	Valid	47	47	47
	Missing	0	0	0
Mean		2.43	2.47	2.55
Median		2.00	2.00	3.00
Mode		2[a]	2	2
Std. Deviation		.853	.776	.775
Variance		.728	.602	.600
Minimum		1	1	1
Maximum		5	4	4

a. Multiple modes exist. The smallest value is shown

Plan Quality Management

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	maturity level 1	6	12.8	12.8	12.8
	maturity level 2	19	40.4	40.4	53.2
	maturity level 3	19	40.4	40.4	93.6
	maturity level 4	2	4.3	4.3	97.9
	maturity level 5	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Perform Quality Assurance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	4	8.5	8.5	8.5
	maturity level 2	21	44.7	44.7	53.2
	maturity level 3	18	38.3	38.3	91.5
	maturity level 4	4	8.5	8.5	100.0
	Total	47	100.0	100.0	

Control Quality

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	maturity level 1	3	6.4	6.4	6.4
	maturity level 2	20	42.6	42.6	48.9
	maturity level 3	19	40.4	40.4	89.4
	maturity level 4	5	10.6	10.6	100.0
	Total	47	100.0	100.0	

Project Human Resource Management Knowledge area

		Plan Human Resource Management	Acquire Project Team	Develop Project Team	Manage Project Team
N	Valid	47	47	47	47
	Missing	0	0	0	0
Mean		2.55	2.77	2.83	2.64
Median		3.00	3.00	3.00	3.00
Mode		3	3	3	3
Std. Deviation		.583	.598	.601	.529
Variance		.340	.357	.362	.279
Minimum		1	2	2	2
Maximum		4	4	4	4

Plan Human Resource Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	1	2.1	2.1	2.1
	maturity level 2	20	42.6	42.6	44.7
	maturity level 3	25	53.2	53.2	97.9

	maturity level 4	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Acquire Project Team

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	15	31.9	31.9	31.9
	maturity level 3	28	59.6	59.6	91.5
	maturity level 4	4	8.5	8.5	100.0
	Total	47	100.0	100.0	

Develop Project Team

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	13	27.7	27.7	27.7
	maturity level 3	29	61.7	61.7	89.4
	maturity level 4	5	10.6	10.6	100.0
	Total	47	100.0	100.0	

Manage Project Team

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	18	38.3	38.3	38.3
	maturity level 3	28	59.6	59.6	97.9
	maturity level 4	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Project communication management knowledge area

		Plan Communications Management	Manage Communications	Control Communication
N	Valid	47	47	47
	Missing	0	0	0
Mean		2.23	2.09	2.26
Median		2.00	2.00	2.00
Mode		2	2	3
Std. Deviation		.633	.686	.943
Variance		.401	.471	.890
Minimum		1	1	1
Maximum		4	3	4

Plan Communications Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	4	8.5	8.5	8.5
	maturity level 2	29	61.7	61.7	70.2
	maturity level 3	13	27.7	27.7	97.9

	maturity level 4	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Manage Communications

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	9	19.1	19.1	19.1
	maturity level 2	25	53.2	53.2	72.3
	maturity level 3	13	27.7	27.7	100.0
	Total	47	100.0	100.0	

Control Communication

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	12	25.5	25.5	25.5
	maturity level 2	15	31.9	31.9	57.4
	maturity level 3	16	34.0	34.0	91.5
	maturity level 4	4	8.5	8.5	100.0
	Total	47	100.0	100.0	

Project Risk Management knowledge area

		Plan Risk Management	Identify Risks	Perform Qualitative Risk Analysis	Perform Quantitative Risk Analysis	Plan Risk Responses	Control Risks
N	Valid	47	47	47	47	47	47
	Missing	0	0	0	0	0	0
Mean		2.81	2.81	3.06	2.91	2.85	2.51
Median		3.00	3.00	3.00	3.00	3.00	2.00
Mode		3	3	3	3	3	2
Std. Deviation		.576	.680	.604	.620	.625	.547
Variance		.332	.463	.365	.384	.390	.299
Minimum		2	2	2	2	2	2
Maximum		4	5	4	5	4	4

Plan Risk Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	13	27.7	27.7	27.7
	maturity level 3	30	63.8	63.8	91.5
	maturity level 4	4	8.5	8.5	100.0
	Total	47	100.0	100.0	

Identify Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	15	31.9	31.9	31.9
	maturity level 3	27	57.4	57.4	89.4
	maturity level 4	4	8.5	8.5	97.9

	maturity level 5	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Perform Qualitative Risk Analysis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	7	14.9	14.9	14.9
	maturity level 3	30	63.8	63.8	78.7
	maturity level 4	10	21.3	21.3	100.0
	Total	47	100.0	100.0	

Perform Quantitative Risk Analysis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	10	21.3	21.3	21.3
	maturity level 3	32	68.1	68.1	89.4
	maturity level 4	4	8.5	8.5	97.9
	maturity level 5	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Plan Risk Responses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	13	27.7	27.7	27.7
	maturity level 3	28	59.6	59.6	87.2
	maturity level 4	6	12.8	12.8	100.0
	Total	47	100.0	100.0	

Control Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	24	51.1	51.1	51.1
	maturity level 3	22	46.8	46.8	97.9
	maturity level 4	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Project Procurement knowledge area

		Plan Procurement Management	Conduct Procurements	Control Procurements	Close Procurements
N	Valid	47	47	47	47
	Missing	0	0	0	0
Mean		3.57	3.55	3.36	3.00
Median		4.00	4.00	3.00	3.00
Mode		3	3	3	3
Std. Deviation		.617	.583	.605	.590
Variance		.380	.340	.366	.348

Minimum	3	3	2	2
Maximum	5	5	4	4

Plan Procurement Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 3	23	48.9	48.9	48.9
	maturity level 4	21	44.7	44.7	93.6
	maturity level 5	3	6.4	6.4	100.0
	Total	47	100.0	100.0	

Conduct Procurements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 3	23	48.9	48.9	48.9
	maturity level 4	22	46.8	46.8	95.7
	maturity level 5	2	4.3	4.3	100.0
	Total	47	100.0	100.0	

Control Procurements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	3	6.4	6.4	6.4

	maturity level 3	24	51.1	51.1	57.4
	maturity level 4	20	42.6	42.6	100.0
	Total	47	100.0	100.0	

Close Procurements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 2	8	17.0	17.0	17.0
	maturity level 3	31	66.0	66.0	83.0
	maturity level 4	8	17.0	17.0	100.0
	Total	47	100.0	100.0	

Project Stakeholder Management knowledge area

		Identify Stakeholders	Plan Stakeholder Management	Manage Stakeholder Engagement	Control Stakeholder Engagement
N	Valid	47	47	47	47
	Missing	0	0	0	0
Mean		2.09	2.40	2.36	2.26
Median		2.00	2.00	2.00	2.00
Mode		2	2	3	2
Std. Deviation		.686	.614	.673	.675
Variance		.471	.377	.453	.455
Minimum		1	1	1	1
Maximum		3	4	3	3

Identify Stakeholders

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	maturity level 1	9	19.1	19.1	19.1
	maturity level 2	25	53.2	53.2	72.3
	maturity level 3	13	27.7	27.7	100.0
	Total	47	100.0	100.0	

Plan Stakeholder Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	2	4.3	4.3	4.3
	maturity level 2	25	53.2	53.2	57.4
	maturity level 3	19	40.4	40.4	97.9
	maturity level 4	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

Manage Stakeholder Engagement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	5	10.6	10.6	10.6
	maturity level 2	20	42.6	42.6	53.2

	maturity level 3	22	46.8	46.8	100.0
	Total	47	100.0	100.0	

Control Stakeholder Engagement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	maturity level 1	6	12.8	12.8	12.8
	maturity level 2	23	48.9	48.9	61.7
	maturity level 3	18	38.3	38.3	100.0
	Total	47	100.0	100.0	

Appendix D OVERALL PROJECT MANAGEMENT MATUIRITY

Project Management Knowledge Areas and components	**Maturity levels (percent of 47 respondents)**				**Mean (PMM Level)**
	1	**2**	**3**	**4**	**5**
Project Integration Management Maturity					**2.38**
Develop Project charter		12.8	72.3	14.9	3.02
Project Plan Development		40.4	55.3	4.3	2.64
Direct and Manage Project Work	23	61.7	14.9		1.91
Monitor and control Project Work	23	61.7	14.9		1.91
Integrated Change Control		23.4	61.7	14.9	2.85
Close Project or Phase		23.4	61.7	14.9	1.94
	1	**2**	**3**	**4**	**5**
Project Scope Management Maturity					**2.36**
Plan Scope Management	6.4	44.7	48.9		2.43
Collect requirements.	13	48.9	34	4.3	2.3
Define Scope	8.5	48.9	40.4	2.1	2.36
Create WBS	13	53.2	34		2.21
Validate Scope	4.3	57.4	38.3		2.34
Control Scope	2.1	51.1	42.6	4.3	2.49
	1	**2**	**3**	**4**	**5**
Project Time Management Maturity					**2.01**
Plan Schedule Management	4.3	66	29.8		2.26
Activity definition	17	70.2	12.8		1.96
Activity Sequencing	23	57.4	19.1		1.96
Estimate Activity resources	28	59.6	12.8		1.85
Activity Duration Estimating	19	66	14.9		1.96
Schedule Development	28	46.8	25.5		1.98
Schedule Control	11	66	23.4		2.13
	1	**2**	**3**	**4**	**5**

Project Cost Management Maturity						**2.01**
Plan cost Management	11	57.4	29.8	2.1		2.23
Cost Estimating	28	55.3	17			1.89
Determine Budget	17	68.1	14.9			1.98
Cost Control	21	63.8	14.9			1.94
	1	**2**	**3**	**4**	**5**	
Project Quality Management Maturity						**2.48**
Plan Quality Management	13	40.4	40.4	4.3	2	2.43
Perform Quality Assurance	8.5	44.7	38.3	8.5		2.47
Quality Control	6.4	42.6	40.4	10.6		2.55
	1	**2**	**3**	**4**	**5**	
Project HR Management Maturity						**2.70**
Plan Human resource Management.	2.1	42.6	53.2	2.1		2.55
Acquire Project team		31.9	59.6	8.5		2.77
Develop Project team		27.7	61.7	10.6		2.83
Manage Project team		38.3	59.6	2.1		2.64
	1	**2**	**3**	**4**	**5**	
Project Communications Management						**2.2**
Plan communications Management	8.5	61.7	27.7	2.1		2.23
Manage communications	19	53.2	27.7			2.09
control communications	26	31.9	34	8.5		2.26
	1	**2**	**3**	**4**	**5**	
Project Risk Management Maturity level						**2.8**
Plan risk Management		27.7	63.8	8.5		2.81
Identify risks		31.9	57.4	8.5	2	2.81
Perform Qualitative risk Analysis		14.9	63.8	21.3		3.06
Perform Quantitative risk Analysis		21.3	68.1	8.5	2	2.91
Risk Response Planning		27.7	59.6	12.8		2.85
Control risks		51.1	46.8	2.1		2.51
	1	**2**	**3**	**4**	**5**	

Project Procurement Management Maturity						**3.37**
Plan Procurement Management			48.9	44.7	6	3.57
Conduct Procurements			48.9	46.8	4	3.55
Control Procurements		6.4	51.1	42.6		3.36
Close Procurements		6.4	51.1	42.6		3
	1	**2**	**3**	**4**	**5**	
Project stakeholder Management Maturity						**2.28**
Identify Stakeholders	19	53.2	27.7			2.09
Plan stakeholder Management	4.3	53.2	40.4	2.1		2.4
Manage Stakeholder Engagement	11	42.6	46.8			2.36
Control Stakeholder Engagement	13	48.9	38.3			2.26
Overall Project management maturity level						**2.46**