Addis Ababa University College of Business and Economics school of commerce

ASSESSMENT OF PROJECT MANAGEMENT MATURITY LEVEL OF ETHIOPIAN ROAD AUTHORITY

A Project work submitted to School of Graduate studies at Addis Ababa University College of Business and Economics in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Project Management

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Addis Ababa, Ethiopia

Statement of Declaration

I, MaruEndale, have conducted independently a research work on the topic entitled "Assessment of project management maturity level of Ethiopian road authority " in partial fulfillment of the requirement for the Degree of Masters of art in Project Management with the guidance and support of the research advisor WubshetBekalu (PhD).

This study is my own work that has not been submitted for any degree or Master program in this or any other institutions.

MaruEndale

Signature _____

Date _____

Addis Ababa, Ethiopia

Statement of Certification

This is to certify that MaruEndale has conducted this research work on the topic entitled "Assessment of project management maturity level of Ethiopian road authority" under my supervision. This work is original in nature and it is sufficient for submission for the partial fulfillment for the award of Degree of Masters of Art in Project and Management.

WubshetBekalu (PhD)

Signature _____

Date _____

Addis Ababa University
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MA Project Work

By

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Approved By Board of Examiners

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Advisor	Signature	Date

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Examiner	Signature	Date

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Examiner	Signature	Date

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Abstract

The paper is conducted on title assessment of project management maturity level of Ethiopian road authority. It is specifically carried out to identify weakness and strength of Project management in Ethiopian road authority by identifying project management maturity level and benchmarking standard of the road authority for other project driven organizations.Structured standard questioners are prepared and distributed at ERA to project experts and project team leaders then primary data are collected. A model called micro frame self- assessment tool is used to level the maturity of project management under authority. Data are analyzed using Ms. Excel to compute average project management maturity level of ERA. Results are discussedqualitatively by comparing with theoretically and empirically accepted values and natures. Based on analysis Ethiopian road authority project management maturity level is identified to be 3 which are characterized by well organized, institutionalized activities and undertakings. Project risk management is relatively at lower level and project procurement management is at higher level. As a result the paper recommended that Ethiopian road authority should integrate all ten knowledge areas in the computerized system and strengthen internal networking among variable to meet performance as planned then sustain level 3.not only sustaining the level but also improvement to level 4 and level 5 are requirements.

Key words; project management maturity, project management maturity level, project management knowledge areas

Acronyms (abbreviations)

ERA	Ethiopian road authority
CMM	capability maturity model
CMMI	capability maturity model
ERCCO	Ethiopian Roads Construction Corporation
GTP	growth and transformation plan
MDE	ministry of development enterprise
NPC	national planning commission
PERT	Program Evaluation and Review Technique
PM	project management
$(PM)^2$	project management maturity model
PMBOK	project management body of knowledge
PMI	project management institute
POO	project oriented organization
SDG	sustainable development goal
SEI'	software engineering institute
WBS	work break down structure

CHAPTER ONE

Introduction

1.1. Back ground of the study

(Soderlund, 2004) states that most of the emergent industries since world-war II are project intensive. This widespread use of projects in organizations demanded an approach that can efficiently manage these temporary endeavors which are critical to the organizations strategic objectives. This led the researchers and professionals of the field to devise an approach that can efficiently manage the projects.

In less developed countries the implementation of project management tools and techniques is still in its early phases of development. It is a relatively modern practice that attempts to achieve planned objectives within specific time and cost limits, through optimum use of resources and using an integrated planning and control system (Abbasi and Al Mharmah, 2000).According to Schlichter (1999) project management has led a number of organizations to be more effective and efficient in delivery of their products and Services, to have more accurate budgeting and scheduling and improved productivity. The growth and acceptance of project management is continuing to increase as resources become scarce in less developed countries.

Management by projects is definitely here to stay but mechanisms to monitor the capability of public organization in managing projects are yet to be established. It is recognized that projects and their management involve a complex environment brought about by the nature of the projects themselves and the environment in which these projects are executed. Rwelamila (2007)noted that, management by projects is an organizational strategy of organizations dealing with an increasingly complex environment. He further states that this environment is affected by a number of forces originating from the project itself, the organization sponsoring the project, and the organizations involved in project implementation, the sector or industry relevant to the service or product resulting from the project, forces from the country/economy and forces coming from the world environment on economics, politics and other social pressures. Garies&Huemann (2000) state that to sail through the forces indicated, an organization must pursue the following objectives: 1) Organizational differentiation and decentralization of management responsibility; 2) Quality planning, control and assurance by project team work and holistic

project definitions; 3) Goal orientation and personnel development; 4) Organization of organizational learning by projects.

In order to deliver successful projects in a changing business environment, organizations need to put efforts on best practices and focus on fit-for-purpose outputs based on the requirements. Projects need to be able to create, maintain and disseminate knowledge and experiences since it is becoming increasingly important for projects to achieve a competitive advantage. Knowledge and experience exist only in the minds of key individual participants and an organization cannot create knowledge or learn by itself. Organizational culture can support creative individuals or provide contexts in which they can create and transfer knowledge. Mature organizations not only create clear communication channels but they also promote a culture where new knowledge can be created and shared.

1.1.1 Back ground of organization

Economic growth in Ethiopia

Ethiopia has long term perspective plans which is sub divided in to successive medium term five years growth and transformation development plans to be among lower middle income countries by 2025 (GTP2 2016-2020). Ethiopia registered average economic growth rate of 10.2% in the first growth and transformation plan. Though the challenges, economic growth of 8% has been registered in the 2016/17 where as 23.4% of the population are under poverty (NPC 2016/17 GTP performance report). The second growth and transformation plan of Ethiopia which is to be realized through industrial transformation is aligned with SDG with motto no one has to be left behind at 2030. To be in line with thealiened SDG, Ethiopia has to work hard in poverty reduction to meet intended SDG motto. Among the five areas of poverty reduction areas included under growth and transformation plan is infrastructure. Road is one sub set of infrastructure which supports for rapid economic growth by promoting effective linkageand fast transportation.

History of Ethiopian road authority

Road in Ethiopia reached its current status starting from small roads trails and foot paths in the 17th and 18th centuries. In the 18th century, especially during the reign of Emperor Rewords, although the technology was primitive it was believed that planned road construction efforts were made.In 1903 the road from Eritrea to Addis Ababa and the road from Addis to Addis

Alem were built. In addition it was during this time that the first Asphalt roads appeared in Addis.ERA was reestablished by proclamation No.63/1993 with a view to providing a strong administration under the leadership of a Board. As part of its reform, the government assigned administration of rural roads to the regional self-governments and main roads to ERA as part of the Federal Government's responsibility. ERA's role regarding rural roads was then limited to rendering support such as overall network planning, training and technical assistance as required by Regional Governments.*Abrham T.(2004).*

Currently, the main responsibilities of ERA are network planning; management of contract projects and force account operations. The long-term objective is to focus on policy, planning and contract administration and to pull out gradually from direct operational works.

Organizational Structure and Arrangement

ERA has reorganized its operations and regulatory departments as independent institutions. The former Operations Department has been reorganized as a public contractor as Ethiopian Roads Construction Corporation (ERCCO) by council of Ministries Regulation No.248/2011.

1. The Regulatory Department has been reorganized as ERA by council of Ministries Regulation No.247/2011 with responsibility to plan and manage the road network and supervise road works and is accountable to Ministry of Transport.

2. The highest authority of ERA is laid on the Board of Directors. ERA is directed by the Chief Executive Office called the Director General. Under the Director General there are three Deputy Director Generals (DDGs). These are Deputy Director General of Planning & ICT, Engineering Operations Deputy Director General, and Human Resource & Finance Deputy Director General.

The vision of ERA is "To assure the utmost economic and social benefits of the customers by Joining Ethiopian road network to middle income countries in 2028." The mission of ERA emanates from the purpose it was established under proclamation No. 247/2011. Its mission is "by sustainably expanding, improving and maintaining the road network timely with quality and less cost, provide quality road to Ethiopians to contribute meaningful support for the universal development of the country. Currently ERA planned to increase the total length of road coverage in the whole country from 110,414km at 2015 to 220.000km almost double by 2020 (GTP2, 2016-2020). Expanding road infrastructure and linking different sectors is a base for rapid economic growth .To realize what is planned at 2020, effective road project managers are un questionable and competent project management is a requirement..(www.era.gov.et)

The paper is to recommend the best and upper proposed project management maturity model for future improvement since Maturity models can identify organizational project management strengths and weaknesses and provide benchmarking information.With this to identify Ethiopian road authority road project management maturity level and propose improvement to achieve its mission with intended duration of time so that the planned coverage of road constructions will be completed to the level of quality requirement.

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1.2 Statement of problem

Ethiopia targeted to be one among lower middle income countries by 2025 G.C. The target is aimed to be achieved through industrial transformation by focusing on small scale manufacturing. Ethiopia registered five years (GTP1) average economic growth rate of 10.2% which was planned to be achieved with industrial transformation. Industry has been registered average growth rate of 20% in the first growth and transformation plan implementations.

All the programs planned to be achieved in GTPII requires number of projects. Success full implementations of the projects need for project management skill and competency and it is success factor for project objectives. Ethiopia as a developing country faced with project management challenges both technical and non-technical. First and foremost, there is a scarcity of empirical studies on the success or otherwise of project management in Ethiopia, thus leaving no documentation on the best practices in that field. Secondly, whilst projects in general have their challenges regarding implementation and consequently success, development projects in particular are faced by a unique set of problems and challenges (survey on mega projects by NPC,2016).

Strategic alignment of projects with country policy and programs requires high level project management maturity hence forth requires skill on the ten project management knowledge areas and the five project management process groups. Industrial transformation is linked to major supply from agricultural out puts and dominantly by small holder farming. Small holders farming are at rural areas where there is no adequate road infrastructure (GTPII). But Transportation is a tool for the integration and linkage among different units of the country to promote industrial transformation and it needs road facility.

To realize the countries mission the intended lower middle income country in terms of road infrastructure Ethiopian road authority project management has to be well equipped with project management knowledge areas as it is project driven organization. Project management capability of project driven organization is measured using project management maturity levels. Project management maturity level is determined using project management knowledge areas and project management process groups(PMI 2013).

Price Water House Coopers (2004) revealed that thereis a positive correlation between project maturity and project performance. Research by (Abadir H. Yimam, 2011) on project management maturity of Ethiopian construction contractors identified that the low maturity level. According to Sonnekus and Labuschagne (2004), a link exists between project management maturity and project

success. Many conducted researches in developed countries assured that there is positive relationship between project management maturity levels and project success.

Survey conducted on Mega projects in Ethiopia revealed that the cause for failure and under performance in the projects is project management knowledge area by project teams(MDE, 2017).

Though there is quality problems observed as challenges, almost none literature review has presented comprehensive image of the existed research on project management maturity level in Ethiopia. Literatures revealed that identifying project management maturity level of project organization enables to identify existing weaknesses and strength and make ready for improvement. A Survey conducted at ERA by NPC on project implementation performance revealed that project management culture at ERA needs improvement. Researcher has a belief that identifying the true reference frame is the first step for improvement. As a result, researcher is aspired to identify the current project management maturity level of ERA and identify the current project management weakness and strength then recommend for improvement to achieve its vision then countries vision. Hence forth ,this paper will be conducted to see maturity level of project management in Ethiopian road authority

1.3 Research questions

Based on stated problem the paper would ask questions listed below to be addressed by the research

- What is the current project management maturity level of Ethiopian road projects?
- What are the strength and weaknesses in project management of Ethiopian road authority projects?
- What is the quality level of Ethiopian road authority projects management?

To address the above list of research questions the paper put forwarding general and specific objective

1.4 General Objective

The main objective of this paper is to assess the current project management maturity level of Ethiopian road projects

1.4.1 Specific objectives

Specifically the paper will be designed

- To Benchmarking the authority's project management maturity level for other sectors projects management in Ethiopia
- To identify and assess the quality level of Project Management Practices in Ethiopian road authority
- To Identify weakness and strength of project management of Ethiopian road project's

1.5 Significance of the paper

Ethiopia has vision to be among the lower middle income countries by 2025. The mission is to be achieved by long term (perspective) plans which is sub divided in to five years growth and transformation plans prepared by respective sectors. Each sector has programs supported by number of projects. From surveys conducted at central statics and national planning commission Ethiopia, most Ethiopian development projects are not achieving their performance as planned because of ineffective project managements at project cites and project organizations. Infrastructure is among the five sectorial planning in Ethiopia and it includes road construction. Ethiopian road authority is a sub set of infrastructure and is a project driven organization which need project management skill and techniques. Project management skills are limited to the project knowledge areas and project management process groups. According to PMBOK guide line and empirical evidences, project performance increases with the better understanding of the project management knowledge areas and project management process groups. The level of awareness or understanding in project management knowledge areas and process groups is scaled as project management maturity level. From empirical reviews of prior researches there is strong relationship between project management maturity level and project performance. Maturity levels of project management are leveled by different models which are called project management maturity level models. Hence, this paper is to assess and determine the maturity level of Ethiopian road authority.Being project management is recent phenomenon, the knowledge in Ethiopia around project knowledge area is limited, Ethiopian road authority is project drive organization and among intended poverty reduction infrastructure componentthis paper is significantly contributes

- For other researchers to be as an engine to conduct research in the area and resolve project management related problems at project driven organizations in Ethiopia
- To show the position of Ethiopian road authority interims of its project management maturity level and gives recommendation for further improvement.
- For development planners to give insight to incorporate project management maturity levels at each sectors development annual and five years plan.
- For development planners to bench mark out performing project organization project management maturity level and recommend training modules for lower performing organizations and experience sharing based on the level of benchmarking

1.6 Scope of the research

The paper is to be conducted on the assessment of project management maturity level of Ethiopian road authority and it will be conducted at office level. The research will be conducted within two months period of time and will be conducted by using structured questionaries' and document reviews from Ethiopian road authority office located at Mexico Addis Ababa. The questionaries' are limited to the ten project management knowledge areas. It also is limited to the assessment of project management maturity level.

1.7 Limitations

The research could face a number of limitations listed below

- Project management at professional level in Ethiopia is recent phenomenon and nearly none of the professionals at project organization are project management graduates to date hence could not have theoretical project management knowledge and discipline. As a result the professionals at Ethiopian road authority could have lower level of understanding forresponding the questionaries' as they level to each component.
- Today project details of project activities and performances could not be well documented hence, respondents could not be confident as they respond to the questionnaires'.
- Project is one time activity, complex, multi- dispensary and dynamic hence managing project needs in-depth and detail understanding of project activities hence it need to see all details related to the project management but two months period of time limited researcher to be attached with only office level data (information) and has not cover all project management areas in detail. Hence the result could be too specific to project management maturity level to affect project success
- The respondent might be careless as they respond to questionaries' and accuracy to the leveling of maturity could be possible limitations.
- The questionnaires are closed ended and would not allow respondentsfor free discussion to narrate additional imputes for leveling.

CHAPTER TWO

Review of RelatedLiteratures

This chapter includes threesections which are theoretical review, empirical review of related literature and conceptual frame work. Under the theoretical review terms are defined. Under empirical literature the reviews of previous related literatures on project management maturity level and project management maturity model are described. Under the conceptual frame relationship between project management maturity level and the ten knowledge area has described and each of knowledge area has discussed.

2.1 Theoretical Literature review

2.1.1 Definitions of terms

Project; - is a temporary endeavor undertaken to create a unique product or service, temporary means that the project has a definite ending point, and unique means that the product or service differs in some distinguishing way from all similar products or services (PMI, 1996, p.4).

Project management;-Project management as a formal managerial discipline is said to have evolved in the middle of the 20th century, when the first Program Evaluation and Review Technique (PERT) marked the beginning of a new discipline. Hamilton (2004), states that modern project management has really come to the ascendancy and has been developing over the past 40-50 years. Initially project management developed in a limited number of engineering based industries during the 1950s, 1960s and 1970s (Morris, 1994). With time, tools, techniques, and methods became standard across industries and businesses as more and more organizations began witnessing the benefits of organizing work around projects.

Project management is defined as an application of knowledge, skills, tools and techniques to project activities to meet project requirements. This is accomplished through the application and integration of the project management processes of initiation, planning, executing, monitoring and controlling and closing (PMI, 2004). (Soderlund, 2004) states that most of the emergent industries since world-war II are project intensive. This widespread use of projects in organizations demanded an approach that can efficiently manage these temporary endeavors which are critical to the organizations strategic objectives.

Project management maturity;-Project management maturity refers to the progressive development of an enterprise-wide project management approach, methodology, strategy, and deci-

sion-making process. The appropriate level of maturity will vary for each organization based on its specific goals, strategies, resource capabilities, scope, and needs.**(PMBOK 5th edition)***)*

According to Kerzner(2003), maturity in project management is the implementation of a standard methodology and accompanying processes such that there existed a high likelihood of repeated success. Andersen &Jessen (2003) refer to maturity as "a state where an organization is in perfect condition to achieve its objectives. Project maturity would then mean that the organization is perfectly conditioned to deal with its projects."

Maturity;-Maturity is defined by many writers differently in closely related way. Some of the definitions given are presented here under.

"Maturity is the extent to which a specific process is explicitly defined, managed, measured, controlled, and effective. Maturity implies a potential for growth in capability and indicates both the richness of an organization's (Project Management) process and the consistency with which it is applied in projects throughout the organization." (Paulk, Curtis, Chrissis, & Weber, 1993)

Organizational Maturity is "the extent to which an organization has explicitly and consistently deployed processes that are documented, managed, measured, controlled, and continually improved." [(CMMI Product Team, 2002, p. 582).cited by (Cooke-Davies, 2005)]

"Maturity is the level of sophistication that indicates organizations current project management practices and processes".

"The degree to which an organization practices project management measured by the ability of an organization to successfully initiate, plan, execute, monitor and control individual projects." (Project Management Institute (PMI), 2003).

According to (Chrissis, Konrad, &Shrum, 2003) , a matured process is well understood throughout a mature organization; usually through documentation and training, and the process is continually being monitored and improved by its users. The capability of a mature process is known. Process maturity implies that the productivity and quality resulting from an organization's use of the process can be improved over time through consistent gains in the discipline achieved by using its process .A mature organization has an organization-wide ability for managing initiatives based on standardized and defined management processes. In such organizations, activities are carried out according to defined processes and plans. Roles and responsibilities are well defined

and understood. Such organizations have also an objective way of measuring performance and quality;

Project management maturity level; -A **maturity level** is a well-defined evolutionary plateau toward achieving a mature project management process. Each **maturity level** provides a layer in the foundation for continuous process improvement. Most proposed modelshave five staged representation, there are five **maturity levels** designated by the numbers 1 through 5.

Through the widely adopted capability maturity model developed by Software Engineering Institute (SEI) of Carnegie-Mellon in 1986 and 1993 for software organizations (Skulmoski, 2001), the concept of process maturity migrated to a measure of organizational process maturity. Integral to the model is the concept that organizations advance through a series of five stages of maturity: initial level- No formal methodology, no project portfolio management, the score is from 0 to 1; repeatable level- Systemic Planning and control with a standard methodology, the score is from 1.1 to 2.0; defined level- Merging of product and PM processes, the score is between 2.1 and 3.0; managed level - Integrated PM and business systems with a score between 3.1 and 4.0; optimizing level- Continuous PM process improvement with a score between 4.1 and 5.0.

Various studies have been done on project maturity assessment in organizations e.g. Ibbs&Kwak, 2000. In their studies of different types of industry i.e. Information Systems, Information Management and movement, High tech manufacturing in the United States of America, they found that high tech manufacturing had the highest knowledge maturity of 3.4 while the level of maturity for Engineering Construction companies was 3.3. The lowest was Information Systems with 3.0. In this study Ibbs&Kwak compared maturity level with project performance and showed that it was possible to correlate project maturity with project performance

Project management maturity models; - A **maturity model** is a framework that is used as a benchmark for comparison when looking at an organization's processes. It is specifically used when evaluating the capability to implement data management strategies and the level at which that company could be at risk from said strategies.It is a collection of reliable, proven processesfocused on a specific discipline. Five-step framework ranges from basic tosophisticated practices.

One can identify the following prominent models, Project Management Process Maturity (PM2) model also known as Ibbs model which emphasizes the aspect of financial return on investment, the Kerzner model (Kerzner, 2005), Organizational Project Management Maturity Model (OPM3) by PMI, and the Garies model (Garies,2003) which views maturity in the form of a spiral rather than a stepwise process. According to Powell (2003) all the models inherently have some of the following characteristics: An assessment of project management practices, processes and people competencies; A benchmark with other organizations within the sector and with industry in general; A review of the average performance of projects in terms of cost, time, quality, scope (or other measures such as user satisfaction, Safety Health Environment etc.) against others in the sector or general industry

PM Solutions' Project Management Maturity Model (PMMMSM) describes how organizations mature as they improve their project management processes. The model is based on the *PMBOK® Guide's* ten knowledge areas with five distinct levels of maturity. Each level represents a discrete organizational capability based on the organization's maturity in each of the knowledge area components listed. The five levels of maturity are as follows:

Level 1: Initial Process

- Ad hoc processes
- Management awareness

Level 2: Structured Process and Standards

- Basic processes; not standard on all projects; used on large, highly visible projects
- Management supports and encourages use
- Mix of intermediate and summary-level information
- Estimates and schedules based on expert knowledge and generic tools
- Project-centric focus

Level 3: Organizational Standards and Institutionalized Process

- All processes standard for all projects and repeatable
- Management has institutionalized processes
- Summary and detailed information
- Baseline and informal collection of actual data
- Estimates and schedules may be based on industry standards and organizational specifics

- Organizational focus
- Informal analysis of project performance

Level 4: Managed Process

- Processes integrated with corporate processes
- Management mandates compliance
- Management takes organizational entity view
- Solid analysis of project performance
- Estimates and schedules normally based on organization specifics
- Management uses data to make decisions

Level 5: Optimizing Process

- Processes to measure project effectiveness and efficiency
- Processes in place to improve project performance
- Management focuses on continuous improvement

2.2 Empirical review of literatures

2.2.1 Review of related literatures on project management maturity level and project performance

Empirical evidence on Measuring Project Management Maturity - A framework for better and efficient Projects delivery by Muhammad Mateen (2015) conducted by survey questions examining internal document and by informal participation revealed that project management maturity has a direct impact on project performance. A high value of project management maturity ensures high performance for delivering projects whereas project performance will be low for less mature project management processes.

Research report by pm solutions(2014) on title of project management maturity &bench marking concluded that project with High performers are more likely to have project management processes established than low performers (95% vs 84%). High performers are also much more likely to have project management processes in place more than 5 years (49% vs. 24%).

A research report on Project Management Maturity & Value Benchmark 2014 by pm solutionsconducted on assessments of project performances and their maturity level from 2001 to2014 revealed that Organizations have seen considerable value by increasing the level of their project management maturity. An increase maturity level of project management resulted in a significant percentage of improvement in projects aligned with business objectives (37%), decrease in failed projects (29%), customer satisfaction (26%), projects delivered under budget (23%), and productivity (21%). Organizations at the highest levels of project management maturity (Levels 4-5) have seen the greatest value by increasing the level of their project management maturity, especially in improvements in aligning projects with business objectives (53%) and bringing products/services to market (45%).

A study on management of project knowledge in a project-based Organization a case study of research enterprise by Sokhanvar, Shahram, Matthews, Judy H., &Yarlagadda, Prasad K(2014) with objective to investigate for KM practices at the existing PMMMs. it was exploratory and inductive nature , qualitative methods using case studies. It under took by selecting three cases from different industries: research; mining and government organizations, to provide broad categories for research and research questions were examined using the developed framework. The result revealed that PMOs with higher maturity level have better knowledge management; how-

ever, some improvement is needed. In addition, the importance of KM processes varies at different levels of maturity. From KM process point of view, knowledge creation and capturing are the most important processes, while knowledge transferring and reusing received less attention. In addition, it was revealed that provision of "knowledge about client" and "project management knowledge" is the most important types of knowledge that are required at low level of maturity.

A research report on Project Management Maturity & Value Benchmark 2014 by pm solutions revealed that average value organizations have seen by increasing their level of project management maturity resulted in a decrease in failed projects by 29%, an improvement in Projects delivered ahead of schedule by16%, Projects delivered under budget by 23% Improvement in projects aligned with objectives by 37% , Improvement in productivity by 21% Cost savings per project (% of total project cost) by16% , an Increase in customer satisfaction by 26% and Cost savings per project US $71K

A study on assessing project management maturity by Young HoonKwak, Ph.D.1 and C. William Ibbs, Ph.2 (2013) used a PM Maturity Model and assess the maturity of PM processes. The research is conducted by preparing 148 multiple choice questions that measure PM Maturity. Those questions cover eight Knowledge Areas and six Project Phases. PM Maturity Model and methodology were then applied by benchmarking 38 different companies and government agencies in four different industries. It revealed thatThe PM Maturity assessment for all companies averaged 3.26 on a relative scale of 1 (lowest) to 5 (highest). Company scores variedconsiderably, so industry-wide composite averages are somewhat misleading. Even industriesand companies with the highest scores have substantial opportunity to improve. RiskManagement and the Project execution Phase are areas of low maturity and Cost Managementand the Project Planning Phase are areas of high maturity.It concluded thatPM Maturity assessment methodology provides solid and comparativestudies on PM practices across industries and companies within an industry.

A research on the maturity level of the project management, In e-commerce projects in Greece by Ilia's K. Filias (2008) used maturity model to assess the maturity model of e- commerce at Greece so as to move from one maturity model to the next.it determined the average maturity level 2.92 on 1-5 maturity level rating proved that the success rate of the projects was linked closely with the maturity level.

The paper on project maturity in organizationsby Erling S. Andersen and Svein Arne Jessen(2002) with the purpose developing an understanding of what project maturity is and investigating the level of project maturity in organizations today . Developed the hypothesis that project maturity develops through a maturity ladder where the ladder steps are proposed to be project management, program management, and portfolio management. Maturity itself was measuredalong three dimensions knowledge (capability to carry out different tasks), attitudes (willingness to carry them out), and actions (actually doing them). It further divided different dimensions of maturity into sub-concepts, which should provide a good understanding of the project maturity of an organization. It developed questionnaire on a preliminary understanding of project maturity, and conducted initial survey. The survey had given some support to the ladder construct, and shows that attitudes and knowledge are stronger than the actions taken.It recommended that further work on the questionnaire and surveys.

A major study of project management maturity at a global level was conducted by Price Water House Coopers (2004) in which two hundred responses were gathered from a balanced group of companies from thirty different countries across the globe. Some of the relevant key findings for the study were as follows: That there was a positive correlation between project maturity and project performance. A higher project management level would most likely deliver superior performance in terms of overall project delivery and business benefits; that the current level of maturity is 2.5 indicating that the current state of project management in organizations is at the level of informal processes; that many of the project failures are due to an imbalanced organization; Organizational structure has a big influence in overall project performance. Organization structure influences the performance and outcome of projects

A study of project management maturity in public sector Organizations: the case of Botswana on public sector organizations responsible for infrastructure development in most developing countries are project oriented organizations (POO). It suggested that a number of public project failures in Botswana are symptoms of PM immaturity of public sector infrastructure organizations. Developed questionnaires and administered through a cross section of 20 randomly selected employees involved in project management at various capacities and also administered to another randomly selected sample of private project management practitioners who normally conduct business who formed some form of check on the level of project management maturity. Follow-

up interviews on some of the aspects that were answered in the questionnaire were also done. The findings strongly suggested that an average maturity of 2.3 (on a scale of 5, where level 1 is the lowest level of maturity) being across all PM knowledge areas. Generally the results revealed serious inadequacies in project risk management maturity.it recommended that project management capacity building through training should be strengthened and the process need to start from identification of PM training needs in the organization.

2.3 Conceptual frame work

The diagram below shows ten project management knowledge areas to measure for project management maturity level as project management maturity level is determined by project management knowledge areas.The project management knowledge areas are defined by Project management body of knowledge guild (PMBOK 5th edition) (PMI 19 87 2013) which are explained under the diagram.

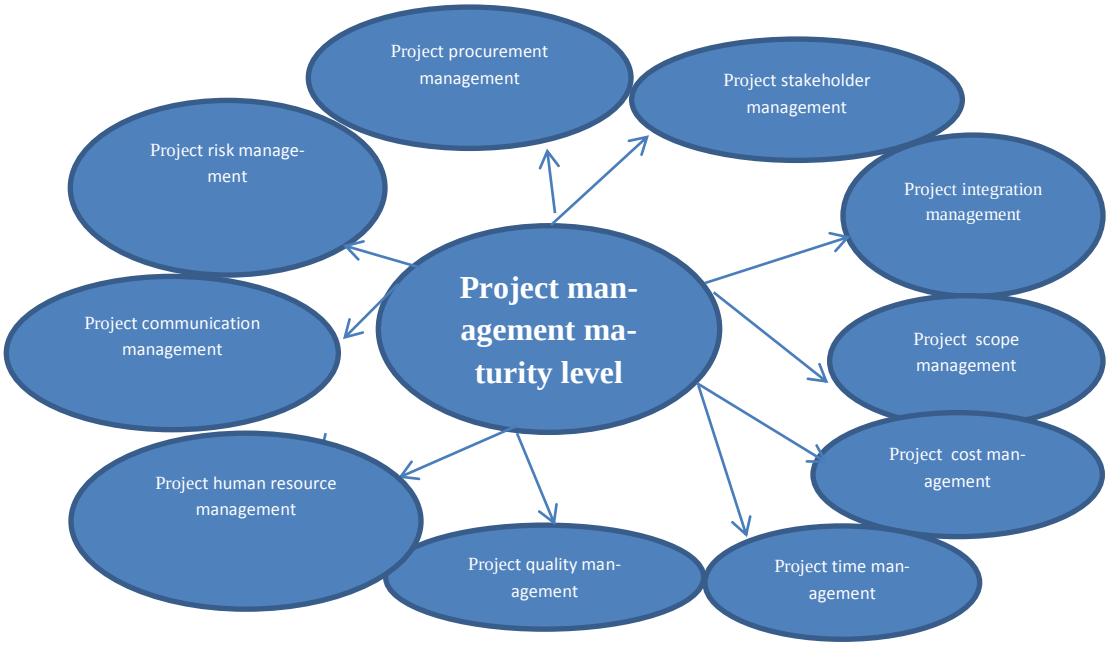

Figure 1 conceptual frame work.

1) **Project integration management**

Project plans are not prepared in an organized fashion, and generally, a project schedule constitutes a plan. A formal change control process or system does not exist in the organization. Project integration management is to guarantee a successful adjustment of all elements project in to one consistent method

2) **Project scope management**

A project may or may not end up meeting customer needs. There is no formal methodology used to decide when to initiate a project; many projects originate because individuals just decide to do them, and the projects may not be officially sanctioned by management. Other projects begin when dictated by management. Project managers are assigned on an ad hoc basis. As a result

Project scope management is to insure that only the necessary work involved to successfully completing the project

3) **Project time management**

Standardized templates for project schedules are not used. Project management software is just beginning to be introduced in the organization and may only be used to list specific tasks to be performed without consideration of network logic or resource requirements. Schedule development may not be realistic as projects are unlikely to be completed when planned. Hence Project time management guarantees the successful completion of project on schedule.

4) **Project cost management**

Costs tend to exceed available budget as poor cost estimating or no cost estimating is performed. Resource planning is ad hoc and not coordinated with cost estimating. Project cost management provides managements with the opportunity that the approved budget is enough for the completion of the project.

5) **Project quality management**

Quality control and quality assurance generally are performed only by external organizations to the performing organization or after the fact by auditors as required by a specific contract. Inspection is the tool used for quality control with a narrow and specific meaning. Project overruns and rework are common and expected. Hence Project quality management is to make sure that the need for customers is met by the project as well as the quality requirements.

6) **Project human resource management**

Project managers who are successful are heroes and are rewarded individually. Project organizations are struggling with the concept of a matrix organization; functional managers are unwilling to share authority with project managers. Most projects are performed under functional organizations or through a weak matrix task force type structure. Therefore, Project human resource management guarantees that people, who are the part of the project, perform in the most efficient way.

7) **Project communication management**

There are cases where Project performance reports are prepared only as needed or requested by senior managers, the contract, or the customer. Performance reporting is limited to status report-

ing and descriptions of accomplishments. Analysis of variance is not performed. No regular project reviews are held. Performance reviews are only held if requested by a customer or as a condition of a contract. Project closeout is not separately planned or managed and is not considered until deliverables have been presented to the customer. Some projects are never closed out. Hence project communication management Insure that flowing process of information of the project, generation, gathering, distribution, storage and allocation.

8) **Project risk management**

There are times where project risk policies are not enacted and a risk management plan is not prepared and Risks are identified after the fact hence project risk management is used to identify, analyze risk and to take alternative course of actions.

9) **Project procurement management**

Project procurement management is a tool to guarantee the effective purchase of goods and service beyond the organizations boundary

10) **Project stakeholder's management**

Managerial process used to identify stakeholders, communicate and engage them, manage expectations and focus on satisfaction.

CHAPTER THREE

Research approach methods

Project management maturity level of project organization is leveled using different approaches of project management maturity models. Project maturity model has series of stages supported by criteria to each level of stages. Under this paper number of structured and standardized questionaries' bymicro frame maturity assessment modelwere used to measure project management maturity level of Ethiopian road authority. Questionaries'has been scaled to five levels of maturity levels ranging from 1-5.

3.1 Research design

The design is descriptive. Structured leveling questionaries' are used as data gathering tools. Information was gathered at ERA office employee. Data are analyzed using MS excel as tool of analysis. Data are analyzed using mixed approach both qualitatively by comparing with theoretical; and empirical findings and quantitatively by comparing computed average project management maturity levels with standard levels of project maturity levels and corresponding discussions and recommendations were carried out.

3.2 Questionnaire Design

Standard questionnaires designed1-5 maturity level by (PMI, 2004) has been used. The structured five level questionerswere prepared for each of ten project management knowledge area to measure the average maturity level. Under each of knowledge area a minimum of three scaled and structured quaternarieswere listed.

3.3 Data Collectionmethods

Fordata collecting 70 questionnaireswere prepared and distributed to Ethiopian road authority at Addis Ababa Mexico area west, east, north, south and central region employee to address the average leveling of the entire project management maturity level throughout Ethiopia. 46of distributed questionnaires were collected and used for analysis.

Purposive sampling technique was applied in distributing questionnairessince the concept of project management maturity level is current phenomenon,researcherhas provided explanation assistance for respondents and made themunderstand meaning of each leveling criteria.

3.4 Method of data analysis

The research is descriptive research since it is designed to describe theproject managementmaturity level of Ethiopian road authority. Descriptive statistics has been employed in determining average maturity level. Excel was used as tool of analysis and descriptive statistics has been applied to take the average leveling of the project management maturity level. Data were analyzed both qualitatively and quantitatively. Qualitative analysis has been conducted by comparing the finding with theoretical and empirical findings from the literature. Data has been quantitativelyanalyzed by computing the average values of all the knowledge areas and taking their average project management maturity levels. Then the average computed values were compared with standards proposed by PMI PMBOK guide lines .the average level of all the ten knowledge areas were computed and compared with standards put under different leveling models from theoretical and empirical reviews.

3.5 Model specification

There are different types of project management maturity models proposed so far and many of the models have similarities in stage of each level but used for different purpose some of the models are as follows

3.4.1 Kerzner's Project Management Maturity Model.

TheKerzner's maturity model defines the five levels using the lack of project management processes to continuous improvement in order to rank the organization (Kerzner, 2001). The five levels are

Level 1 – Common Language; - The organization recognizes the importance of project management and the need for a good understanding of the basic knowledge on project management.

Level 2 – Common Processes;-At this level, the organization recognizes that common processes need to be defined and developed so that project success can be repeated.

Level 3 – Singular Methodology; - The organization defines a single methodology for project management in order to take advantage of the associated synergistic effect.

Level 4 – Benchmarking;- the organization recognizes that process improvement is necessary to maintain competitive advantage.

Level 5 – Continuous Improvement;- At this level, the organization evaluates the information obtained through benchmarking and decides how to improve its processes.

The questionnaire is explained in the book of Kerzner about PM maturity models (Kerzner, 2001). Multiple choice is the structure of the questions, where the respondent selects the answer so that his current situation to be the most closely described

3.4.2 SEI's Capability Maturity Model (CMMI).

The framework that shows the key elements of an effective software development process (Paulk, Weber, Garcia, Chrissis, & Bush, 1993) is the Capability Maturity Model (Paulk et al., 1993) of SEI..

Maturity levels for which process capabilities are described are the start of this process. The question is: "What are the distinguishing capabilities that an organization has when it is at the maturity level X?"After these capabilities are described, the key process areas are determined, accompanied with the goals that are achieved by the use of these process areas. In the next step, the common features that characterize the successful implementation of these areas of process are determined. The CMM defines the five levels of the maturity process, these are verysimilar to those of the (PM)2 model.

The levels (for software development) are defined as follows (Paulk et al., 1993):-

Level 1 – Initial Level; -The organization does not provide a stable environment for software development. Project success depends on having good software managers or teams.

Level 2 – Repeatable Level; - At the repeatable level, the organization establishes basic guidelines for managing the software project and its various procedures.

Level 3 – Defined Level; -The organization has a formally documented standardprocess for developing and maintaining software engineering and management.

Level 4 – Managed Level; - At the managed level, the organization sets quantitative goals for both software products and processes. They have a predictable process.

Level 5 – Optimizing Level;-The entire organization is focused on continuous process improvement. Software processes are evaluated to prevent known types of defects from recurring and lessons learned are spread to other projects.

A CMM example questionnaire is also accessible in (Zubrow, Hayes, Siegel,&Goldenson, 1994). The CMM questionnaire provides the respondent with four options throughout: 'yes', 'no', 'does not apply', and 'don't know', contrary to the (PM)2 questionnaire that is asking the respondent to select the situation description that is the closest to what can be found in his organization. The

type of questions in the CMM questionnaire, allow more distinct answers with less space for interpretation. Consequently, less the support is required for the respondents..

3.4.3(PM) 2 Maturity Assessment Methodology

Professor William C. Ibbs formed a research team at the University of California at Berkeley set itself a goal to investigate the benefits to organizations through financial and organization factors that result from the implementation of the project management processes (Ibbs&Kwak, 1997b). One of their research steps was the develop of a five-level "Project Management Process Maturity: (PM) 2 model would allow the project management process information for a number of organizations to be collected and compared (Ibbs&Kwak, 1998) and to be used in furthermore researches. These five levels of maturity process are described as follows (Kwak, 1997):

Level 1 – Ad-hoc Stage;- Organizations at level 1 do not use formal procedures for executing a project. Project activities are poorly defined and cost estimates are inferior.

Level 2 – Planned Stage; - At the planned stage, informal and incomplete procedures manage a project. The organization has strength in doing similar and repeatable work.

Level 3 – Managed Stage; - Most of the project management problems are identified and informally documented. PM data for project planning and management are collected across the organization.

Level 4 – Integrated Stage;- At the integrated stage, an organization can manage, Integrate, and control multiple projects efficiently. PM process dataare standardized, collected, and stored.

Level 5 – Sustained Stage; - At the sustained stage, PM processes are continuously improved. PM data are collected and rigorously analyzed to improve processes. Innovative ideas are vigorously pursued. The final aim of Ibbs's team is the determination of “success drivers”, i.e. to determine the most critical factors for the success of a project and being able to calculate the magnitude of the return on investment that an organization draws from the raise of its project management process maturity (Ibbs&Kwak, 2000).

3.4.4 MicroFrame’s Self-Assessment Tool.

The Micro frame Technologies and the Project Management technologies have developed a self-assessment tool for maturity in project management and let it available on the Internet. This tool has 50 multiple choice questions (Enterprise Planning Associates, 2000). The result of this quick self-evaluation tool is a ranking in one of the five following levels:

Level 1 – Ad-hoc; - The project management process is described as disorganized, and occasionally even chaotic. Systems and data processes are not defined. Project success depends on individual effort; Chronic cost and schedule problems.

Level 2 – Abbreviated; - Some project management processes and systems are established to track cost, schedule, and performance. Underlying disciplines, however, are not well understood or consistently followed. Project success is largely unpredictable and cost and schedule problems are the norm.

Level 3 – Organized; -Project management processes and systems are documented, standardized, and integrated into an end-to-end process for the company. Project success is more predictable. Cost and schedule performance is improved.

Level 4 – Managed;-Detailed measures of the effectiveness of project managementare collected and used by management. The process is understood and controlled. Project success is more uniform. Cost and schedule performance conforms to plan.

Level 5 – Adaptive; - Continuous improvement of the project management process is enabled by feedback from the process and from piloting innovative ideas and technologies. Project success is the norm. Cost and schedule performance is continuously improving.

As stated above some of the models used specific to IT projects some others are used to compare project management maturity levels of different projects with in sector and organization. But Microframe's self-assessment model evaluates the maturity of an organization at a very high level and prohibits a detailed analysis according to the areas of process or knowledge. However, it gives the organization an idea where they stand in terms of project management maturity process without having to pass through an expensive and complex evaluation process. From this point of view, this self-assessment toolcomes very close to the PM maturity assessment that the author intend to develop forthis study.

In This exploratory research, micro frame self-assessment tool was used as a model to identify project management maturity level of Ethiopian road authority.PM Maturitylevel makes organizations identify their project management position. Hence, the rationality behind using this model is to indicate project management maturity level of ERA in terms of project management and identify weakness and strength in project management to recommend for further improvement.

CHAPTER FOUR

Result and discussion

In this section information's for the analysis are presented and described using graphs and tables then corresponding analysis are carried out.The average project management maturity level for every knowledge area is determined then corresponding discussion on weakness and strengths are identified

4.1 General information

4.1.1 Profession of respondents

Asdepicted graph below total of 46 respondents are involved in the response of the prepared questionnaires. Majorities (77%) of the respondents are civil engineering in profession and 20% are construction management graduates. 24% of respondents did not mention their profession. More than 77% of the respondents are core officers.

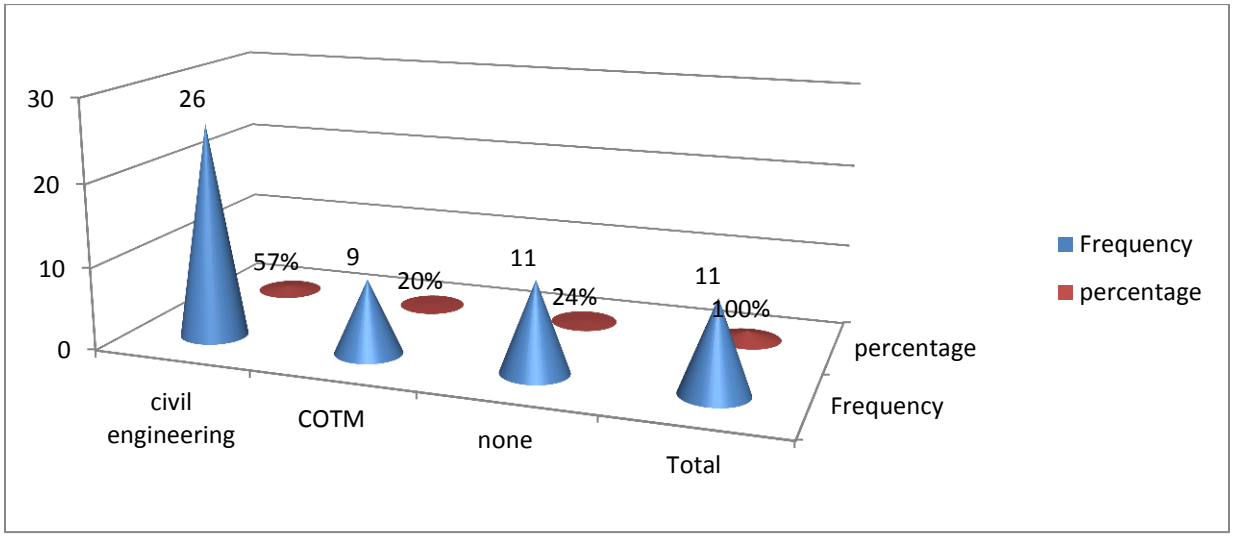

Figure 2 profession of respondents

4.1.2 Departments of respondents

Table below describes the distribution of departments participated in responding questionaries' .Ethiopian Roald authority offices are organized by five regions. All the regions have their own project team leaders under each team leader there are organized teams.There are offices like engineering procurement, contracting teams and others who participated in filling questionnaires'.

out of the total respondents 17% are project contract management department, 37% are project design &building cost management departement,11% of the respondents are from engineering procurement department, and 37 % of the respondents are from other departments.

Table1 departments of respondents

Department	project contract management	project design &building cost management	Engineering procurement	Others	Total
Frequency	8	17	5	16	46
Percentage	17%	37%	11%	35%	100%

4.1.2. Current positions of respondents

As described pie chart below, from the total of 46 respondents, 13% are team leaders, 80 % are project engineers of core office and 7% did not mentioned their current position. No project managers are participated in the responding questionaries'

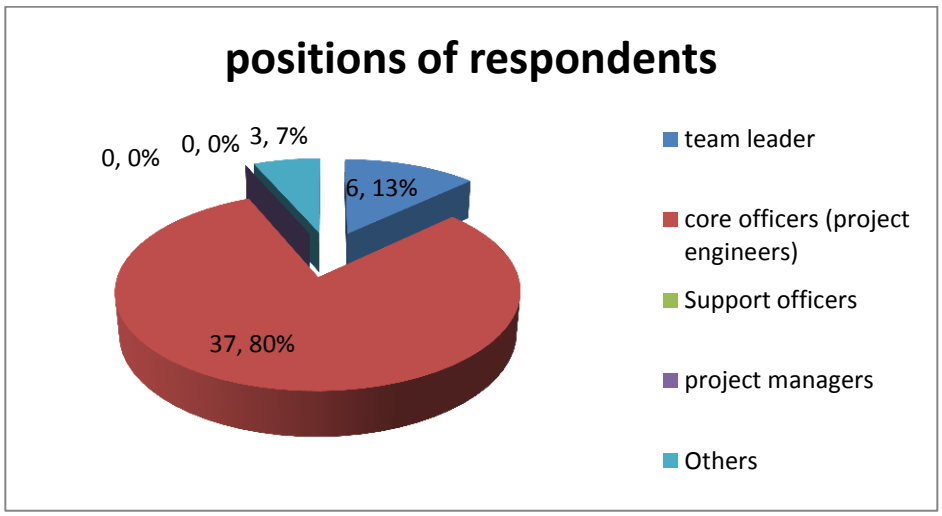

Figure3 current positions of respondents

4.2 Result and analysis

4.2.1 Project integration management

Table 2 Project integration management

Knowledge area ea	Number of respondents						
1. Project integration management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respondents**
1.1 Develop Project Charter	5	21	19		1	2.37	46
1.2 Develop Preliminary Project Scope Statement	7	13	25		1	2.46	46
1.3 Develop Project Management Plan		12	26	6	2	2.96	46
1.4 Develop and Manage Project Execution	3	26	5	8	4	2.65	46
1.5 Monitor and Control Project		11	26	6	3	3.02	46
1.6 Work Integrated Change Control	2	26	4	11	3	2.72	46
1.7 Close Project	4	23	16	3		2.39	46
Average						**2.65**	

Table above depicted that there are seven parameters for measuring and labeling project integration management maturity. The purpose of project integration management is to initiate the project, to coordinate the project activities and integrate all efforts into a project, to integrate, analyze and report the project results in carrying out the project, to control the changes to the baseline, To collect, integrate and organize project information system and To close the project in an orderly and disciplined system.

The result showed that Monitoring and controlling phase of the project integration management cycle has maturity level 3.02 and it is relatively higherand nearer to level 4.It revealed that the

average maturity level of integration management of Ethiopian road authority is 2.65. It indicated that Ethiopian road authority is level 3 in terms of project integration management

4.2.2 Project Scope Management

Table 3 Project Scope Management

Knowledge area	**Number of respondents**						
2. Project Scope Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respondents**
2.1 Scope Planning		9	29	5	3	3.04	46
2.2 Scope Definition		17	21	3	5	2.91	46
2.3 Create WBS		12	34			2.74	46
2.4 Scope Verification		13	24	9		2.91	46
2.5 Scope Control		16	23	3	4	2.89	46
Average						**2.90**	

The purpose of project scope management is to ensure that the project includes all the work required and only the work required completing the project successfully

Project scope management is describedin terms of five criteria listed above table. Thematurity level of each criterion is averaged level 3. Relatively scope planning in Ethiopian road authority road projects has better position in project scope maturity level. Project scope management maturity level of Ethiopian road authority road projects isaveraged 2.90 and it is leveled toproject management maturity level 3.

Project scopemanagement maturity level 3 is characterized by; project scope management plan template exists and is consistently used for all projects, standard format both for technical specifications and Processare in place, project development team and other stakeholders are integrated to WBS process and WBS is used for the determination of the project tasks, project development team manages the scope change control. All the other stakeholders are informed for the changes and the status of the project.

4.2.3 Project Time Management

Table 4 Project Time Management

Knowledge area	Number of respondents						
3. Project Time Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respondents**
3.1 Processes Activity		24	16	2	4	2.70	46
3.2 Definition Activity		22	20	2	2	2.65	46
3.3 Sequencing Activity	5	19	16	5	1	2.52	46
3.4 Resource Estimating	6	23	13	3	1	2.35	46
3.5Activity Duration Estimating	6	13	23	3	1	2.57	46
3.6 Schedule Development		18	21	6	1	2.78	46
3.7 Schedule Control		15	26	3	2	2.83	46
Average						**2.63**	

Project time management is descried by processing activities, defining activities duration, sequencingactivities, estimating resource duration, estimating which activity is accomplished when, scheduling development and controlling schedules.

The result showed that all activities under project time management are leveled to similar project management level. Hence, the average maturity value of project time management of Ethiopian road authority is 2.63 which are leveled as project management maturity level 3. Project time management maturity level 3 is characterized by standardized and repeatable time schedule; managements have institutionalized process and standards. Project activities are documented and project completion with schedule is predicted, processes and standard for all projects are repeatable. But activities are limited to organizational specific standards, process and standards are not open to external factors for further improvement and learning. Project process against plan is not monitored, reported and controlled.

4.4.4 Project Cost Management

Table 5 Project Cost Management

Knowledge area	**Number of respondents**						
4. Project Cost Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respondents**
4.1 Processes Cost Estimating	3	6	29	3	5	3.02	46
4.2 Cost Budgeting	4	5	27	10		2.93	46
4.3 Cost Control	5	6	30	3	2	2.80	46
Average						**2.92**	

Table above describes components of project cost management and their corresponding project management maturity level at Ethiopian road authority. Project cost management determines the total cost of the projects, ensures the project completes with in the approved budget, estimates the cost of identified resources and involves in developing a project baseline, comparing progress against baseline and controlling costs.

The result revealed that Ethiopian road authority project cost management has average maturity valueof 2.92 which is leveled as project management maturity level 3. Among the activities under project cost management at Ethiopian road authority process cost estimating is relatively at better position. Cost estimating is an analytical process using factors, relationships, and expert knowledge to develop the cost of road design process

Project cost management maturity level 3 is characterized by; alternative cost analyzes are integrated to the cost estimations, established historical database, Projects are developing and documenting project baselines at the lowest reasonable level, The capability exists to calculate the budgeted cost of work scheduled and performed, the actual cost of work performed, budget at completion and estimate at completion. The full process is documented and repeatable; Project department team uses the cost change control process, cost reporting process and Performance reports.

4.4.5 Project Quality Management

Table 6 Project Quality Management

Knowledge area	**Number of respondents**						
5.Project Quality Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Aver-age level**	**Total number of respond-ents**
5.1 Processes Quality Planning		15	31			2.67	46
5.2 Perform Quality Assurance		24	16	6		2.61	46
5.3 Perform Quality Control	7	13	23	3		2.48	46
Average						**2.59**	

Project quality management maturity level is described by the above table and it is measured and determined by process quality planning, performing quality assurance and performing quality control. All the activities attached to project quality management of Ethiopian road authority are leveled to similar value of maturity level.

Theresult revealed that Ethiopian road authority project quality management maturity level has value 2.59. The value determined is leveled as project management maturity level 3.

Project quality management maturity level 3 is characterized byQuality planning has Standard-ized checklists for the use of the project team development, Tools and techniques of quality as-surance checklists as standard approaches on larger scale projects are integrated to stake holders by project department team as standards, Project performance standards are identified and begin to be established and measured against. The quality process includes templates and guidelines for review of documents. The client is actively involved in project review and controls with the pro-ject department team. The client and the project department team approves the quality controls by sign offs.

4.4.6 Project Human Resource Management

Table 7 Project Human Resource Management

Knowledge area	**Number of respondents**						
6. Project Human Resource Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respondents**
6.1 Processes Human Resource Planning	8	12	23	3		2.46	46
6.2 Acquire Project Team	7	8	26		5	2.74	46
6.3 Develop Project Team	4	16	23		3	2.61	46
6.4 Manage Project Team		10	23	12		2.98	45
Average						**2.70**	

Project human resource management is about processing human resource planning, acquiring, developing and managing project teams.

Project human resource management maturity result revealed that all the requirements to project human resource management at Ethiopian road authority have similar management maturity values which were averaged to 2.70. Hence Ethiopian road authority is at level 3 project management maturity level in human resource management.

Level 3 human resource management maturity level is characterized by;-Formal analysis is conducted to define the organizational, technical and interpersonal interfaces that exist within the organization; project department team deals with the planning of the staff acquisition, Project teams are assigned automatically, The office has established different project related roles and expects that every individual will develop his/her career, and help them to succeed, All project department team members are expected to have a solid knowledge base about how to plan and track projects. project department team members are encouraged to take certificates and degrees related to project management, Individual Project Management Experience/Competence; Every

individual is evaluated on his/her performance, customer satisfaction, team member satisfaction and triple constraints parameters, project related role competency measurement has been defined and individuals are given a continuum that can be utilized for performance measurement and career growth.

4.4.7 Project Communications Management

Table 8 Project Communications Management

Knowledge area	**Number of respondents**						
7.Project Communications Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respondents**
7.1 Processes Communications Planning	3	8	29	6		2.83	46
7.2 Information Distribution	4	22	11	9		2.54	46
7.3 Performance Reporting		18	12	13	3	3.02	46
7.4 Manage Stakeholders	9	17	11	6	3	2.50	46
Average						**2.72**	

Project communication management as component of project management knowledge area, it is about process communication planning, disseminating information, and performance reporting and managing stakeholders as indicated table above.

The analysis revealed that Ethiopian road authority project communication management components are at similar maturity level. And computed average maturity level of project communication management is valued 2.72 and the value is categorized under project management maturity level 3.

Project communication maturity level 3 is characterized byaccepted communication plan for all projects, formal information retrieval system, formal information distribution system including project meetings, hard copy documentation, and fax, electronic mail and project department team confirms stakeholder satisfaction with information dissemination on a regular basis, and Issues

are consistently addressed during regular, team meetings. The client area is part of determining issues and coming up with proposed resolutions and actions.

4.4.8. Project Risk Management

Table 9 Project Risk Management

Knowledge area	**Number of respondents**						
8.Project Risk Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respondents**
8.1 Processes Risk Management	14	23	9			1.89	46
8.2 Risk Identification	11	26	6	2	1	2.04	46
8.3 Planning Risk Identification	13	28	3	2		1.87	46
8..4 Qualitative Risk Analysis	12	21	9	3	1	2.13	46
8..5 Quantitative Risk Analysis	15	20	10		1	1.96	46
8..6 Risk Response Planning	13	22	11			1.96	46
8.7 Risk Monitoring and Control	10	19	17			2.15	46
Average						**2.00**	

Project risk management is determined the above listed activities , Processing Risk Management, Risk Identification, planning risk identifications, conducting Qualitative Risk Analysis, conducting quantitative Risk Analysis, risk response planning ,risk monitoring and controlling.

The result above showed that all the risk management activities have similar project management maturity level and the average computed value is 2.00. Risk management value 2 is classified under project management maturity level 2.project risk management level 2 is characterized by some risks are listed and identified. Generally time, scope, deliverables and cost are the main problems that can occur during the execution process, there is documented process for risk quantification, and risks are still evaluated on a project by project basis. Risks are listed according to

their importance. Risk status is distributed to key stakeholders and incorporated into the project schedule. Project team may informally think about their strategy for dealing with future risk events and discuss the strategies among themselves. The plan will cover things such as, who is responsible, how the information will be maintained, how plans will be implemented and how reserves will be distributed. Project team applies their own approach during the execution process and activities. Project team assign responsibilities for each risk item as it occurs. Some risks are discussed with meetings in the office. If the scale of the project is larger, risks are considered more carefully. Project teams organize periodic meetings especially for daily activities. The risk status is distributed to key stakeholders and incorporated into the project schedule

4.4.9. Project Procurement Management

Table 10 Project Procurement Management

Knowledge area	**Number of respondents**						
9. Project Procurement Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respondents**
9.1 Processes Plan Purchase and Acquisitions		14	25	3	4	2.93	46
9.2Plan Contracting	2	11	16	14	3	3.11	46
9.3 Request Seller Responses		11	17	10	8	3.33	46
9.4 Select Sellers		17	15	6	8	3.11	46
9.5Contract Administration		15	9	12	10	3.37	46
9.6Contract Closure	4	8	16	12	6	3.17	46
Average						**3.17**	

Project procurement management includes the processes necessary to purchase or acquire products, services, or results needed from outside to the project team. The organization can be buyer

or seller of the products, services, or results of a project. It includes the contract management and change control processes required to develop and administer contracts or purchase orders issued by authorized project team members. As described from the above table project procurement management maturity level is determined by Processing Plan Purchase and acquisitions, planning Contract, requesting seller responses, Selecting Sellers, Contracting administration and Contract Closure.

Project procurement maturity level of Ethiopian road authority is computed to average value of 3.17 and the value is categorized under project management maturity level 4. Most procurement management process of Ethiopian road authority is under project management maturity level 4.

Project procurement level 4 is characterized byClient works with a consultancy company and this company integrates to the project department team. All decisions are made under this project department team structure but again stake holders play a very important role on the decisions. The project's requisition is fully integrated with the organization's requisition process. The project's solicitation and source selection is fully integrated with the organization's solicitation and source selection process. The vendor is required to report progress against plan using the organization's standard project management tools and techniques. Vendors are integrated to the project management processes and activities

4.4.10. Project stake holder management

Table 11 Project stake holder management

Knowledge area	Number of respondents						
10. Project stake holder management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Average level**	**Total number of respond-ents**
10.1 Stakeholders identification	5	23	13	4	1	2.41	46
10.2 Assessment in stakeholders interest and influence	7	20	12		7	2.57	46
10.3 Develop stake-holders communica-tion plan	3	24	10	6	3	2.61	46
10.4 Engaging and influencing stake-holders	4	20	16	6		2.52	46
Average						**2.53**	

Project stakeholder management includes the processes required to identify people, groups, or organizations that could impact or be impacted by the project, to analyses stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging and influencing stakeholders in project decisions and execution.

As can be seen from the above table project stake holder management at Ethiopian road authority maturity level is averaged 2.53 whichare leveled under lever 3 maturity level.

Project stakeholder management maturity level 3 is characterized by standardized method for identifying stakeholders , the organization stake holder identification and influence is based on trends of the project organization, project organization has set standard to guide.

4.3. Discussion

Theories and empirical evidences revealed that there is appositive relationship between project management maturity level and project success. Project success is measured interims of project constraints and customers' acceptance that is project completed within budget, schedule, to the expected scope and meets customer requirement is noted as successful project.

The higher project management maturity levels the greater chance of project success will be attained. Maturity levels are determined by different project management maturity models. Most models have five growing levels and similar levels of the different models have similar activities and definitions.

For all the models, as moved to the higher level the success factor of projects tend to increase that is the higher project management maturity level has greater chance of success.

As described in the literature, micro frame self –assessment maturity model has five staged maturity levels from ad-hock level 1 to adaptive level 5 characterized by continuous improvement or learning.

Organizations at the highest levels of project management maturity (Levels 4-5) have showed the greatest value by increasing the level of their project management maturity, especially in improvements in aligning projects with business objectives (53%) and bringing products/services to market (45%).

As shown table below project management maturity value of Ethiopian road authority is 2.69 and it is categorized to maturity level 3.

Project management Maturity level 3 organizations are characterized by Project management processes and systems are institutionalized, documented, standardized, and integrated into an end-to-end process for the company. Project success is more predictable. Cost and schedule performance is improved. That is Most of road projects in ERA are executed in professional manner by applying the organizational standards and processes, but sometimes the goals were not achieved within the planned time and cost, because in many cases unforeseen events lead to additional cost and time.

A research report on Project Management Maturity & Value Benchmark 2014 by pm solutions revealed that average value organizations have seen by increasing their level of project management maturity resulted in a decrease in failed projects by 29%, an improvement in Projects delivered ahead of schedule by16%, Projects delivered under budget by 23% Improvement in projects

aligned with objectives by 37% , Improvement in productivity by 21% Cost savings per project (% of total project cost) by16% , an Increase in customer satisfaction by 26% and Cost savings per project US $71K. ERA by improving its current project management maturity level 3 to maturity level 4 then to level 5 could get the above mentioned advantages.

There were the integrated systems and process of knowledge areas in execution and controlling of project activities. Success rate of the projects was linked closely with the maturity levelIlia's K. Filias (2008).The upper project management maturity levels 4 and 5 have more progress and improvement. In project management Level 4 (Managed level) maturity level, detailed measures of the effectiveness of project management are collected and used by management. The process is understood and controlled. Project success is more uniform. Cost and schedule performance conforms to plan. In Level 5 (Adaptive level), Continuous improvement of the project management process is enabled by feedback from the process and from piloting innovative ideas and technologies. Project success is the norm. Cost and schedule performance is continuously improving.

4.3.1 Project management maturity level of Ethiopian road authority

Table below describes maturity levels of ten project knowledge areas and average maturity level which defines the current project maturity level of Ethiopian road authorityMaturity level

Table 12 Project management maturity levels

No	Ten knowledge areas	Maturity levels					Average
		level 1	level 2	level 3	level 4	level 5	
		Ad-hoc	Abbreviated	Organized	Managed	Adaptive	
1	Integration management			2.65			
2	Scope management			2.90			
3	Time management			2.63			
4	Cost management			2.92			
5	Quality management			2.59			
6	Human resource management			2.70			
7	Communication management			2.72			
8	Risk management		2.00				
9	Procurement management				3.17		
10	Stake holders management			2.53			
project management maturity level							2.69

From the lists of knowledge areas project quality management and stake holder management are relatively at lower position compared with other knowledge areas. Unless otherwise activities at level 3 are well managed and controlled sustaining level 3 creates its Owen question.

Project procurement management at Ethiopian road authority indicated maturity value of**3.17** which is classified under project management maturity level **4.** As compared with the rest of nine knowledge areas project procurement management in Ethiopian road authority is at better position. Ethiopian road authority project procurement management is not only institutionalized and standardized but also decisions incorporate and participates stakeholders. Project's requirements are fully integrated with the organization's requirements.

Literatures revealed thatOrganizations at the highest levels of project management maturity (Levels 4-5) have seen the greatest value by increasing the level of their project management maturity, especially in improvements in aligning projects with business objectives (53%) and bringing products/services to market (45%).project's solicitation and source selection is fully integrated with the organization's solicitation and source selection process.

Project risk management has maturity level 2. It indicates that basic processes of risk management are well defined and applied to all projects. Some project risk management processes and systems are established to track cost, schedule, and performance. Underlying disciplines, however, are not well understood or consistently followed. Project success is largely unpredictable and cost and schedule problems are the norm.Project management maturity has a direct impact on project performance. A high value of project management maturity ensures high performance for delivering projects whereas project performance will be low for less mature project management processes,Muhammad Mateen (2015). Empirical evidence serious inadequacies in project risk management maturity recommended that project management capacity building through training should be strengthened and the process need to start from identification of PM training needs in the organization. The low level of project risk management at ERA could be improved by identifying training needs and building capacity on risk management and risk related factors.

CHAPTER FIVE

Summary of major findings, Conclusion and recommendation

5.1 summary of major findings

5.1.1 Respondent's profile

- Majorities (77%) of the respondents are civil engineering in profession; all respondents are core project officers.
- 13% of respondents are team leaders, 80 % are project engineers

5.1.2 Major findings

Project management maturity level of ERA is determined level three

- Project success is more predictable
- Cost and schedule performance is improved
- Most of road projects are executed in professional manner by applying the organizational standards and processes

But sometimes the goals were not achieved within the planned time and cost, because in many cases unforeseen events lead to additional cost and time.

Project procurement management at ERA indicated maturity value of 3.17, which is classified under project management maturity level 4?

- As compared with the rest of nine knowledge areas project procurement management in Ethiopian road authority is at better position. Ethiopian road authority project procurement management is not only institutionalized and standardized but also decisions incorporate and participates stakeholders.
- Project's requirements are fully integrated with the organization's requirements

Project risk management has maturity level 2. It indicates that

- basic processes of risk management are well defined and applied to all projects
- Project risk management processes and systems are established to track cost, schedule, and performance.
- Underlying disciplines, however, are not well understood or consistently followed.
- Project success is largely unpredictable and cost and schedule problems are the norm.

Project integration management, scope management, time management, cost management, quality management, human recourse management, communication management, and stakeholder management have maturity level greater than 2 and leveled to maturity level 3.

At this level

- Project management processes and systems are institutionalized, documented, standardized, and integrated into an end-to-end process for the company.
- project scope management plan template exists and is consistently used for all projects, standard format both for technical specifications and Process are in place
- standardized and repeatable time schedule
- Alternative cost analyzes are integrated to the cost estimations, established historical database.
- The quality process includes templates and guidelines for review of documents
- Formal analysis is conducted to define the organizational, technical and interpersonal interfaces that exist within the organization
- accepted communication plan for all projects
- the organization stake holder identification and influence is based on trends of the project organization, project organization has set standard to guide

5.2 Conclusion

As mentioned in the literature part of this paper, project management maturity level and project success are strongly positively related. Project maturity level is determined by assessing activities of each project management knowledge areas. If project management maturity level is not affected by project management knowledge areas the problem is assigned to organizational structure of the project driven organization (Price Water House Coopers (2004).

According to pm solution (2014), maturity models have benefits which allow looking into the organization's strength and weakness, Identify the links between needs and real education requirements, Set realistic targets for improvement, provide a roadmap for strategic improvement, Measure progress towards enhanced capability and Assess organization's project management against agreed criteria. Maturity is indicated by the award of a particular "Maturity Level". Maturity level assessment will provide benefits to project organizations since a known Maturity Level, with precise recommendations on how to improve ability for organizations to com-

pare their Maturity Level with other organizations, or other parts of their own organization and help for big improvement on self-assessments (Pm solution 2014).

This paper assessed the project management maturity level of Ethiopian road authority road project. Based on analysis result on the ten project management knowledge areas of Ethiopian road authority the paper concluded the following points

The overall project management maturity level at Ethiopian road authority road project is at maturity level 3. This indicates that most organizational standards and processes were achieved by most of project management knowledge areas and applied to all projects. However, in some cases, like project risk management elements are not completely standardized and thus processes arenot applied properly and effectively.

Project procurement management maturity level of Ethiopian road authority is relatively higher than the rest of knowledge areas and it is at maturity level 4. This indicates that the authority's procurement management not only well standardized and institutionalized it is also well controlled and managed however continuous learning and improvement is still a requirement.

Project risk management maturity level of Ethiopian road authority is relatively lower than the rest of knowledge areas and it is at maturity level **2.** Some project management processes and systems are established to track cost, schedule, and performance. Underlying disciplines, however, are not well understood or consistently followed. Project success is largely unpredictable and cost and schedule problems are the norm.

5.3 Recommendation

Micro frame self-assessment tool project management maturity developed in this project thesis has many potential application areas as well as imperfections and limitations. The limitations and imperfection in this tool are attached to details of knowledge areas and process groups of project management. The methodology developed in this study is expected to assess the project management Maturity level of Ethiopian road authority. In order to provide necessary information to make improvement in their project management processes and activities. It should be stressed that the development of this model is the most important issue. Most of the knowledge areas are at maturity level 3 that is all activities in the authority is institutionalized and standardized based on major project methods and activities. This paper only considered the maturity levels of

knowledge areas based on the given standards from the model. As a result,based on findings the paper recommended that;-

- Project integration management, scope management, cost management, quality management, human resource management, communication management, and stake holder management are at level 3. Implies management is based on the designed method and procedure taken from some projects that is all methods of project management to all project in the authority are the same. It is known that project is unique in nature the method applied to one project might not be effective to apply for other projects. For one thing level 3 is repeatable and it has tobe sustained in the authority project management since level 3 is structured relative to lower levels.To sustain level 3 with respective knowledge areas, ERA should introduce computerized system with improved internal networking to track activities as planned and should work on human resource development through continuous training on activities of knowledgeareas and applications of computerized system. For the other thing level 3 is below levels 4 and level 5. Moving to level 4 helps the authority to manage and integrate all the activities and their immediate impact then enable to track lessons from past undertakings for future improvement, moving to level 5 makes to continuously be adapted and improved to situations and customers requirements then to be competitive, therefore ERA by benchmarking successful project organizations should focus on change management and continuous improvement by preparing effective trainings and sharing experiences with other successful project driven organizations .
- Project risk management in the authority is at maturity level 2. At this level (Abbreviated level), some project management processes and systems are established to track cost, schedule, and performance. Underlying disciplines, however, are not well understood or consistently followed. Project success is largely unpredictable and cost and schedule problems are the norm. At this level risk expertise is left to individual experts. Risk identification, risk analysis, response technique and strategies are well understood at expert level but not institutionalized.This implies that risk managements of road projects under Ethiopian road authority are limited to individual experts. In the authority project risks are planned but no standardized in to same methods to identify, analyses, and control risks. Hence moving one step up to level 3 enables the authority road project managers set common method for handling risk. Ethiopian road authority concerned officials should focus on the standardization-

of risk handling techniques and tools to improve current risk handling in their road projects. Making improvement to level 3 enables their road Project success more predictable. Cost and schedule performance improved. Preparing independent risk management department for planning,identifying, analyzing and controlling activities related risk would enhance the current risk handling culture in the authority's project risk management.Hence, there should be separate risk management department and risk should be managed independently with accountability.

- Project procurement department of Ethiopian road authority should be taken as benchmarking for the other departments to manage their respective areas of knowledge. As project procurement management has the highest maturity level 4, it is relatively at better position in the authority project management knowledge areas.At level 4 activities are well organized and controlled however continuous learning and improvement are still requirements. Hence, project procurement management has to improve its current status and move to project management level 5, Ethiopian road authority managers haveto focus on other successful project organizations and share experiences then should apply the best practice to the authority's procurements management for further improvement and continuous learning.
- By taking the currently identified project management maturity level of Ethiopian road authority as benchmarking, Development planning department of the Ethiopian road authority should apply for all projects under the authority and incorporate project management maturity level improvement to their plan while they are preparing short term medium term and long term plans.
- Research should be conducted on details of each ten knowledge area of authority's project management for further improvement since level 4 and level 5 are still requirements for improvement.

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Appendix

Questionaries'

Questionnaires listed below are standard questioners prepared by PMI and listed under PMBOK guide line to measure project management maturity levels of project driven organization. The level enables the project driven organization where its position is in terms of project management and project success. To level each list of question there are benchmarking references listed above the table.

Hence, please refer to the reference criteria's for eachof leveling to undertake. Your prompt and genuine response to each of the questionaries' helps the genuine leveling of Ethiopian road authority project management maturity level and contributes to recommendations for further improvement in the organizations project management and success of projects within the context of Ethiopian road authority. In addition to its improvement it will also help Ethiopian road authority project management maturity level bench marking for project managements of other project driven organization and will use it as stepping stone for the improvement of project management in Ethiopia and hence success of projects in Ethiopia. Therefore it is yours genuine response which drives to effective analysis and conclusion then fruitful recommendations. Confidentiality of the response and data you provided to the research will strictly be protected. Your information will be used only for this research purpose. The research is conducted for master's thesis of project management at Addis Ababa university school of commerce. Your dedication, sacrifices of time, genuinely leveling to each of the question and contribution to the overall imputes of the research will be counted. Researcher would like to thank you in advance for all your collaboration in the participation of the research in filling the questionaries'

No need of writing your name and address on this paper

Part A. **General Information**

1. What is your profession…….
2. Department you are currently working in…….
3. What is your position

a. Core Officer b. project manager c. Support officer d. other ……

Part B. Project management maturity leveling

Please level each of the issues raised under table based on the characteristics of the levels listed below

Level 1 If;-

- It isGetting Started but disorganized
- Awareness is developed and ad hock
- It is at its initial stage
- Do not use formal procedure

Level 2 if;-

- informal and incomplete procedures are applied
- Basic processes; not standard on all projects; used on large, highly visible projects
- Management supports and encourages use
- Mix of intermediate and summary-level information
- Estimates and schedules based on expert knowledge and generic tools
- Project-centric focus

Level 3 if;-

- All processes standard for all projects and repeatable
- Management has institutionalized processes
- Summary and detailed information
- Baseline and informal collection of actual data
- Estimates and schedules may be based on industry standards and organizational specifics
- Organizational focus
- Informal analysis of project performance

Level 4 if;-

- Processes integrated with corporate processes
- Management mandates compliance
- Management takes organizational entity view
- Solid analysis of project performance
- Estimates and schedules normally based on organization specifics
- Management uses data to make decisions

Level 5 if;-

- Processes to measure project effectiveness and efficiency
- Processes in place to improve project performance
- Management focuses on continuous improvement

Put✓mark under leveling for each of the questionaries'

Knowledge area	**Maturity levels**				
Project integration management	Level 1	Level 2	Level 3	Level 4	Level 5
Develop Project Charter					
Develop Preliminary Project Scope Statement					
Develop Project Management Plan					
Develop and Manage Project Execution					
Monitor and Control Project					
Work Integrated Change Control					
Close Project					
Project Scope Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Scope Planning					
Scope Definition					
Create WBS					
Scope Verification					
Scope Control					
Project Time Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Processes Activity					
Definition Activity					
Sequencing Activity					
Resource Estimating					
Activity Duration Estimating					
Schedule Development					
Schedule Control					
Project Cost Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Processes Cost Estimating					
Cost Budgeting					

Cost Control					
Project Quality Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Processes Quality Planning					
Perform Quality Assurance					
Perform Quality Control					
Project Human Resource Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Processes Human Resource Planning					
Acquire Project Team					
Develop Project Team					
Manage Project Team					
Project Communications Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Processes Communications Planning					
Information Distribution					
Performance Reporting					
Manage Stakeholders					
Project Risk Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Processes Risk Management					
Risk Identification					
Planning Risk Identification					
Qualitative Risk Analysis					
Quantitative Risk Analysis					
Risk Response Planning					
Risk Monitoring and Control					
Project Procurement Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Processes Plan Purchase and Acquisitions					
Plan Contracting					
Request Seller Responses					
Select Sellers					
Contract Administration					
Contract Closure					
Stakeholder Management	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Stakeholders identification					
Assessment in stakeholders interest and influ-					

ence					
Develop stakeholders communication plan					
Engaging and influencing stakeholders					