Assessment study on the Challenges of Project Management Knowledge Areas

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Abstract

This study was conducted to identify the most challenging PMKAs in the external funded agricultural research projects of EIAR. The qualitative research approach with descriptive research designs was implemented. Both primary and secondary data collection methods were used. Respondents were purposively identified. Based on this technique 124 respondents were identified. Respondents were working in 30 projects. Interviewees were also organized for 30 key informants from each project. The collected data were analysed through SPSS. The Cronbach's Alpha test result of the questionnaire is 0.85. The result shows that, challenges related with organizational environment, project risk management, project time management, project cost management, and project quality management are the most challenging knowledge areas whereas the other PMKAs are moderately challenging.

Keywords: *Project Management Knowledge Areas, External Funded Projects, and EIAR.*

1. Introduction

The objective of this study was to identify the most challenging project management knowledge area in the external funded agricultural research projects of the Ethiopian Institute of Agricultural Research (EIAR). A project is a temporary endeavour undertaken to create a unique product, service or result. It is also temporary in that it has a defined beginning and end time, defined scope and resources. According to PMBOK® Guide (5th edition) a project is unique in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal. Before the project begins, the organization is commonly referred to as being in the current state. The desired result of the change driven by the project is described as the future state.

Project management, on the other hand is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is accomplished through the appropriate application and integration of project management processes. The concept of project management comes in to existence after the time when the five volunteers founded the Project Management Institute (PMI) in 1969. Now a day, PMI is a non-profit project management professional association and the most widely recognized organization in terms of promoting project management best practices.

According to Njogu *et.al.* (2017) project management is an important activity in many organizations which serves as a strategy for implementation and continuous improvement of projects. The implementation of project management concept empowers organizations to execute projects effectively and efficiently. An Effective project

management helps individuals, groups, public and private organizations to meet business objectives, to satisfy stakeholder expectations, to be more predictable, to increase chances of success, to deliver the right products at the right time, to resolve problems and issues, to respond risks in a timely manner, to optimize the use of organizational resources, to identify, recover, or terminate failing projects, to manage constraints (e.g., scope, quality, schedule, costs, resources), to balance the influence of constraints on the project, and to manage change in a better manner.

A poorly managed projects or the absence of project management may result in missed deadlines, cost overruns, poor quality result, needs rework, uncontrolled expansion of the project, loss of reputation for the organization, unsatisfied stakeholders, and failure in achieving the objectives for which the project was undertaken. The finding of PMI's "Pulse of the Profession" 2015 report, states that organizations lose close to ~USD 109 million for every billion spent on projects and programs across the globe due to mismanagement of projects.

Project Management Knowledge Area is an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques. Crispin (2018) the standard for project management and the guide to the Project Management Body of Knowledge (PMBOK® Guide) present knowledge using three overlapping models of life cycles, process groups, and knowledge areas.

According to the project management institute (PMI, 2017); there are ten knowledge areas; project integration management, project scope management, project time management, project cost management, project quality management, project human resource management, project communications management, project risk management, project procurement management, and project stakeholder management

The impacts of the inapplicability of PMKAs are different from project to project. Besides the non-implementation of the ten project management knowledge areas has no equal impact on the project. Khaled A. Alwaly *et. al.,* (2020) on his study on the application of PMBOK® guide conclude that project quality management ranked first in the construction sector in Yemen.

Project managers also have no equal understanding on the ten project management knowledge areas. According to Martina (2016) project scope management, project quality management and project risk management as most problematic knowledge areas with lowest level of knowledge among project managers. Azozama (2016) also examined the extent of PMBOK® guide application by construction project managers in South Africa, he found that some construction project managers apply the PMBOK® partially, but generally, they do not apply it structurally. He concludes that, the limited application of PMBOK® is one of the main causes for the prevalence of delays and cost overrun within the built environment in South Africa.

In our country, there are few studies conducted on project management, project management process groups, and PMKAs. For instance, Muhidin (2017) found that project monitoring and control has vital importance to achieve both organizational goals and project objectives. Tadesse A. (2016) concluded that the level of construction project management practice in terms of adapting general project management procedures, project management functions, tools & techniques are unsatisfactory. Misgana (2019) asserted that, lack of project management skills and training in project management is the most significant challenge factor. From PMKAs, project risk management, project schedule management, project stakeholder management and project scope management are very challenging. The findings of Tesfahun (2019) also strengthen the conclusions of Misgana, he founds that the performance of construction projects and the awareness of construction project manager's on PMKAs have direct relationship. Natnael H. (2019) assessed the project management practices of gudina tumsa foundation, Ethiopia. According to his findings, project scope, schedule, and risk are not well managed whereas; project integration, human resource, procurement, stakeholder, and communication are properly implemented in the project.

This study was conducted by drawing lessons of other studies and tried to comprehensively assess the implementation level of the ten project management knowledge areas on external funded agricultural research projects of EIAR.

To fill the gap, the researcher crafted a research question; which project management knowledge areas were the most challenging for implementation on external projects?

2. Materials and Methodology

In this study, the researcher used the qualitative research approach, because the objective of the study is to identify the most challenging PMKAs in the external funded projects of EIAR. So, the qualitative research approach gives the researcher an opportunity to discuss the issue in depth, it gives for respondents a certain degree of freedom to answer questions, the research questions are typically addressed from the experiences of respondents, and the data used for the study are non-numerical type.

The researcher used a descriptive type of research design. Descriptive research design gave for the researcher an opportunity to capture a population's characteristic, Cooper & Schindler (2008). It also helps the researcher to identify the gap, to describe the current practice, to determine answers of what, who, where, when and how questions of a research and involves collection of information without changing their environment. This means, in descriptive design the research subjects are not influenced in any way by the researcher's tendency in the process.

2.1 Data type, Source and Methods of data collection

The researcher has used both quantitative and qualitative data. Primary and secondary data collection methods were used for data collection. Primary data had been collected mainly using semi-structured interviews and questionnaires, while the secondary data were gathered from literatures, annual reports, books and other data sources.

Questionnaires were distributed for external funded agricultural project coordinators (PI), research centre directors, headquarter process directors, project team members, and research support staff members. Totally the researcher distributed 124 questioners. Out of it, 106 questionnaires were collected. The questionnaire was composed of closed-ended matrix questions. Matrix questions present the respondent with a range of questions against which they are expected to respond based on a predetermined Likert rating scale.

Interviews were organized mainly to exploit the experiences of the interviewee and to gather sufficient explanation from selected project coordinators and top management bodies of the institute. There is no rule as such regarding the determination of sample size for an interview, but for the purpose of meeting trustworthiness, the researcher has interviewed 30 individuals (18 senior project coordinators, 10 sector directors and 2ex-top manager of the institute).

2.2 Target Population

The target population of the study were 180 employees that were working on 97 external funded agricultural research projects. These 180 employees of EIAR were actively involved and participated in the planning, implementation, monitoring & evaluation, and controlling of these 97 research projects.

2.3 Sampling Technique

Purposive sampling technique was implemented to select studied projects and participants in order to get the right respondents who are capable of giving the relevant and accurate information based on the practical experience they have regarding the issues under study. Therefore, from 97 external funded projects 30 projects were purposively selected, and from 180 target population, 124 respondents who have an active role in these 30 projects were identified. Purposive or judgmental sampling enables the researcher to use its own judgment to select cases that will best able to answer research question(s) and to meet objectives (Sanders et al., 2009).

2.4 Sample Size Determination

Target population is the population that the researcher studies, and whose findings are used to generalize for the entire population (Mugenda et.al, 2003). The target population of this study consisted of researchers and experts who have an involvement in the external agricultural projects for the past five years, from 2016 to 2020. Lists of completed and on-going projects are registered by the planning monitoring & evaluation directorate of EIAR. Through purposive sampling technique 30 sample projects, 15 were completed before 2020 and 15 projects are still on-going, were identified.

To determine the sample population, Yamane Sample sizes Calculation (1967) method were implemented. According to him, for a 95% confidence level and p = 0.5, size of the sample should be calculated by the following formula:

$$n = \frac{N}{1 + N (e)^2}$$

Size of population (N)	Sample Size (n) for Precision (e) of:		
	1%	5%	10%
50	50	45	33
100	99	80	49
125	124	95	55
150	148	108	59
180	177	**124**	63

Source: study result, 2021

2.5 Methods of Data Analysis

The data collected through questionnaire and interviews were analysed using descriptive statistical techniques and the result presented qualitatively as well as quantitatively. For this purpose, Statistical Package for Social Science (SPSS V. 23) was used as a best option.

Results were interpreted and findings are presented in tables and analysed through percentages, mean scores and standard deviations. The interpretations of the results were analysed against each research question.

2.6 Validity and Reliability

The validity and reliability of the questionnaire has been checked. Further a reliability test of Cronbach's Alpha was made for the likert scale type questions on SPSS version 23. Cronbach's alpha is a measurement used to assess the reliability or internal consistency of a set of scale or test items. According to Bajpai SR and Bajpai RC (2014) reliabilities less than 0.50 are considered to be poor, those between 0.5 - 0.6 are questionable, those in the range 0.70 - 0.80 acceptable, and those in the range 0.80 - 0.90 are good, and above 0.90 are excellent.
Sample reliability testing was performed before the questionnaire was distributed. Cronbach's alpha reliability test score is 0.85, which is good.

The questionnaire distributed for respondents to collect primary data has contained 113 questions. This questionnaire was distributed for 124 respondents of which 106 (85.48%) respondents was properly filled and returned, the remaining questionnaires were discarded due to different errors.

3. Results

Table 1: Challenges related to Organizational environment

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Lack of proper project management skills and training.	4	3.8	16	15.1	16	15.1	56	52.8	14	13.2	3.57
Lack of information technology support.	4	3.8	29	27.6	5	4.7	61	58.1	6	5.7	3.34
Lack of clearly defined rules and procedures for project management.	5	4.7	31	29.2	20	18.9	42	39.6	8	7.5	3.16
Top management intervention in the project management.	2	1.9	23	21.7	31	29.2	41	38.7	9	8.5	3.30
Lack of proper organization structure to lead external funded projects.	6	5.7	27	25.5	11	10.4	42	39.6	20	18.9	4.41
Average mean score		4.0		23.8		15.7		45.8		10.8	3.56

Source: study result, 2021

From the above illustration on challenges related to organizational environment, lack of proper project management skills and training (66%), lack of information technology support (63.8%), and lack of proper organization structure to lead external funded projects (58.5%) were the most significant challenging factors. The average means score value of challenges related to organizational environment is 3.556 and the standard deviation of 1.07 which indicates organizational environment factors are considered as highly significant.

Table 2: Project Integration Management challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Failure to assign the project coordinator (PI) early in the project launching period.	9	8.5	46	43.4	22	20.8	25	23.6	4	3.8	2.71
Lack of efficient change management skill.	5	4.7	24	22.6	14	13.2	58	54.7	5	4.7	3.32
Lack of clear vision and goals of the project.	11	10.4	60	56.6	10	9.4	15	14.2	10	9.4	2.56
Not breaking down the project work into phases (no clear millstones).	8	7.5	52	49.1	18	17	25	23.6	3	2.8	2.65
Not prioritizing operational activities.	8	7.5	54	50.9	5	4.7	34	32.1	3	2.8	2.71
Gaps in defining key performance indicators, the retrieval, collection, preparation and interpretation of data for monitoring and evaluation.	5	4.7	29	27.4	14	13.2	47	44.3	11	10.4	3.28
Limited resources and budgetary allocations for monitoring and evaluation.	5	4.7	24	22.6	21	19.8	44	41.5	12	11.3	3.32
Lack of project knowledge management system to capture lessons learned.	4	3.8	18	17	22	20.8	50	47.2	12	11.3	3.45
Unnecessary linkage between external funded projects and	11	10.4	20	18.9	27	25.5	32	30.2	16	15.1	3.21

government funded projects.								
Average mean score value		6.9		34.3		16.0		34.6	8.0	3.02

Source: study result, 2021

From the above table on challenges related to project integration management, the average means score value is 3.023 and standard deviation of 1.087 which indicated that factors of project integration management are considered as moderately significant. But, from the interview the researcher has learnt that in most projects, key performance indicators are not clearly defined, monitoring and evaluation activates are not budgeted, lack of efficient change management skill and absence of mechanism designed to capture lessons learned from projects are the most critical challenges in project integration management arena.

Table 3: Project Scope Management challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Repeated request for project amendment.	3	2.8	17	16	26	24.5	46	43.4			3.38
Project schedule discrepancies.	4	3.8	23	21.7	39	36.8	32	30.2			3.16
Inadequately documented project requirements.	5	4.7	39	36.8	19	17.9	36	34	7	6.6	3.01
Expanding the project works without considering the project agreement.	5	4.7	25	23.6	14	13.2	55	51.9	7	6.6	3.32
Average mean score value		4.0		24.5		23.1		39.8		6.6	3.22

Source: study result, 2021

From the above illustration on challenges related to project scope management, the average means score value is 3.22 with standard deviation of 1.03 which showed that project scope management challenges are considered as moderately significant. Yet, the interview result showed that repeated request for project amendment and expanding of the project work without considering the project agreement are still very significant factors in project scope management.

Table 4: Project Time Management Challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Project schedule delays.	5	4.7	13	12.3	8	7.5	65	61.3	15	14.2	3.68
Too tight project schedule and unrealistic deadlines.	3	2.8	12	11.3	17	16	68	64.2	6	5.7	3.58
Inaccurate time estimations.	3	2.8	18	17	13	12.3	64	60.4	8	7.5	3.53
Average mean score value		3.43		13.5		11.9		61.9		9.1	3.59

Source: study result, 2021

From the table above on challenges related to project time management, the average means score value is 3.59 with standard deviation of 0.95 which indicates that project time management challenges are considered as highly significant challenges for EIAR external funded projects.

Table 5: Project Cost Management Challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Inaccurate cost estimation.	6	5.7	14	13.2	14	13.2	65	61.3	7	6.6	3.50
Cash flow difficulties.	3	2.8	22	20.8	12	11.3	59	55.7	10	9.4	3.48
Lack of /poor cost control method.	5	4.7	19	17.9	7	6.6	63	59.4	12	11.3	3.55
Inadequate use of funding	6	5.7	16	15.1	10	9.4	63	59.4	11	10.4	3.54

capital										
Assigning most of the project budget for non-operation activities.	7	6.6	14	13.2	13	12.2	58	54.7	14	13.2	3.55
Average mean score value		5.1		16.0		10.5		58.1		10.2	3.52

Source: study result, 2021

From the table above on challenges related to project cost management, the average means score value of 3.52 with standard deviation of 1.042 which shows that challenges related with project cost management are levelled as highly significant. Besides, I have learnt from interview that inaccurate cost estimation, lack of cost control method, and inadequate use of project fund for other purposes are critical factors that affect the effective implementation of project cost management in most EIAR projects.

Table 6: Project Quality Management Challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Lack of strict quality control measures.	6	5.7	10	9.4	18	17	57	53.8	15	14.2	3.61
Quality checks not performed at satisfactory level.	4	3.8	11	10.4	22	20.8	54	50.9	15	14.2	3.61
Providing poor quality data/ information.	6	5.7	19	17.9	19	17.9	51	48.1	11	10.4	3.40
Providing poor quality reports (technical & financial).	4	3.8	21	19.8	13	12.3	60	56.6	8	7.5	3.44
Average means score value		4.75		14.4		17.0		52.4		11.6	3.52

Source: study result, 2021

From the above illustration on challenges related to project quality management, the means score value is 3.52 with standard deviation of 1.025 which indicates challenges relates with project quality management are levelled as highly significant, and also the interview results also show that providing poor quality reports (technical & financial), lack of implementing strict quality control measures, and poor quality checks are very significant and mostly revealed factors to implement project quality management.

Table 7: Project Human Resource Management Challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Assigning the project coordinator without competition.	4	3.8	16	15.1	17	16	50	47.2	19	17.9	3.60
Wrong selection of project team members.	3	2.8	16	15.1	19	17.9	51	48.1	17	16	3.24
Lack of skilled personnel with adequate capacity.	6	5.7	33	31.1	22	20.8	43	40.6	2	1.9	3.02
Inadequate project structure.	4	3.8	33	31.1	28	26.4	36	34	5	4.7	3.05
Lacking clear roles and responsibilities among team members.	6	5.7	28	26.4	14	13.2	52	49.1	4	3.8	3.19
Assigning one person for many projects as a coordinator.			16	15.1	35	33	27	25.5	28	26.4	3.63
Average means score value		4.36		22.3		21.2		40.8		11.8	3.29

Source: study result, 2021

From the above illustration on challenges of project human resource management, the average means score value is 3.29 with standard deviation of 1.045 which indicates that project human resource management challenges are considered as moderately significant. However, lack of setting clear roles and responsibilities among team members, wrong project team member selection, assigning the project coordinators without competition, and lack of skilled personnel on project management are critical challenges of project human resource management.

Table 8: Project Stakeholder Management Challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Late identification of project stakeholders.	4	3.8	29	27.4	24	22.6	43	40.6	6	5.7	3.17
Low commitment of stakeholders towards planned projects.	4	3.8	15	14.2	25	23.6	49	46.2	13	12.3	3.49
Lack of involvement of project stakeholders.	5	4.7	26	24.5	26	24.5	40	37.7	9	8.5	3.21
Not obtaining stakeholder approval.	4	3.8	22	20.8	26	24.5	48	45.3	6	5.7	3.28
Average means score value		4.0		21.7		23.8		42.5		8.05	3.39

Source: study result, 2021

From the above table on challenges related to project stakeholder management, the average means score value is 3.39 with standard deviation of 1.017 which shows that project stakeholder management challenges are considered as moderately significant. Besides, the interview result showed that low commitment of stakeholders towards planned projects, and lack of involvement of project stakeholders are important factors on the implementation of project stakeholder management.

Table 9: Project Communication Management Challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Lack of professional communication support.	7	6.6	22	20.8	12	11.3	48	45.3	17	16	3.43
Lack of effective communication between stakeholders.	5	4.7	15	14.2	13	12.3	59	55.7	14	13.2	3.58
Delay to provide periodic reports.	3	2.8	23	21.7	12	11.3	50	47.2	17	16	3.52
Weak communication with the project funders.	10	9.4	40	37.7	20	18.9	31	29.2	4	3.8	2.80
Lack of bargaining power to get the appropriate support from the funders.	6	5.7	20	18.9	28	26.4	40	37.7	11	10.4	3.29
Average mean score value		5.84		22.7		16.0		43.0		11.9	3.32

Source: study result, 2021

From the above illustration on challenges related to project communication management, the average means score value is 3.32 with standard deviation of 1.094 which tells us project communication management challenges are moderately significant. However, lack of professional communication support, lack of effective communication between stakeholders, and delay to provide periodic reports are serous factors and revealed in most projects.

Table 10: Project Risk Management Challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Poor risk management plan.	5	4.7	14	13.2	13	12.3	57	53.8	17	16	3.63
Failure to manage expected events.	5	4.7	26	24.5	9	8.5	55	51.9	11	10.4	3.39
Failure to manage unexpected events with no effective / possible response mechanism.	1	1.9	16	15.1	16	15.1	61	57.5	11	10.4	3.59
Average mean score value		3.8		17.6		12.0		54.4		12.3	3.54

Source: study result, 2021

From the above table on challenges related to project risk management, the means score value is 3.54 with standard deviation of 1.032 which indicates that challenges of project risk management are considered highly significant, and almost all of the factors stated in project risk management are significantly affects EIAR projects.

Table 11: Project Procurement Management Challenges

Statement	SD		D		N/S		A		SA		Mean
	F	%	F	%	F	%	F	%	F	%	
Lack of well-prepared procurement plan.	4	3.8	31	29.2	8	7.5	53	50	10	9.4	3.32
Lack of competitive procurement process.	3	2.8	42	39.6	4	3.8	45	42.5	12	11.3	3.20
Lack of transparency and integrity in the procurement process.	5	4.7	32	30.2	13	12.3	48	45.3	8	7.5	3.21
Lack of well-prepared contracts with much detail and clear-documentation.	8	7.5	40	37.7	11	10.4	38	35.8	9	8.5	3.00
Delay to get the procured material/service.	4	3.8	16	15.1	3	2.8	51	48.1	32	30.1	3.86
Average mean score value		4.52		30.4		7.34		44.3		13.4	3.32

Source: study result, 2021

From the above illustration on challenges related to project procurement management, the average means score value is 3.32 with standard deviation of 1.136 which shows that project procurement management challenges are moderately significant. But, lack of well-prepared procurement plan, and delay to get the procured material/service are very important challenges that affect the proper implementation of project procurement management.

4. Conclusion

The aim of this study was to identify the most challenging project management knowledge areas in the external funded agricultural research projects of EIAR. Based on the finding all knowledge areas have their own challenges. However, the extent of the challenge was varying from one PMKA to the other. Therefore, the most challenging PMKAs are organizational environment, project risk management, project time management, project cost management, and project quality management. The other PMKAs like, project integration management, scope management, human resource management, stakeholder management, communication management, and procurement management are moderately challenging knowledge areas.

Acknowledgement

Ethical Consideration

The Author was undertaken various steps to ensure that the study adheres to research ethical standards. The Author was seeking consent from the management of EIAR before administering the questionnaires and other organizational information. Participants were asked to verbally consent to participate in the research, for which they were free to participate or not to. The potential respondents have not been identified by name. The researcher was explained to the respondents that the information will give is to be used only for the purpose of study.

Funding Source

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