



RISK MANAGEMENT PRACTICES AND PERFORMANCE OF SMALL-SCALE IRRIGATION PROJECTS IN KENYA

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ABSTRACT

The performance of public irrigation schemes is way off the mark, realizing only 40% of the target production levels and 28% of the expected revenues compared to private operated irrigation schemes. The general objective was to examine effect of project risks management on performance of small scale irrigation projects in Kenya. The specific objectives were the effect of; acceptance and identification, on performance of small scale irrigation projects in Kenya. The study was guided by two theories; uncertainty theory and prospect theory,. The theories are related to the study objectives. The study employed a descriptive research design. The study targeted 24 public and private small scale irrigation projects implemented in Kenya. The unit of observation 172 personnel involved in the implementation of the irrigation projects; the PCU chairpersons, the counties' ministry of water and irrigation officials, project management committee members, and block leaders. The sample size was determined using census since the study population is less than 200. The study used primary data. The study carried out a pilot test with 17 senior staff involved in management of irrigation projects. The study used content and construct validity. Reliability was tested using Cronbach's Alpha Coefficient. Data was analyzed using SPSS Version 28. Descriptive and inferential statistics were used. The descriptive statistics included frequency, percentage, and mean while inferential statistics included correlation and regression. Risk acceptance affects project performance. The project managers accept the project risks through allocation of resources though they are not enough which may affect project budget. Risk identification affects project performance. Prior identification of project risks enables the project managers to adequately plan or the risks. Professional should involve professionals in management of irrigation projects. The professionals will offer guidance on the possible risks and how to identify them. Identification of the root causes of risks may greatly help in preventing the risks from occurring. The Ministry of Agriculture, Livestock and Fisheries should organize training program for the agricultural officers that oversee implementation of the irrigation projects

Key Words: Risk Management Practices, Risk Acceptance, Risk Identification And Performance Of Small-Scale Irrigation Projects

Background of the Study

Project risk management is referred as the art and science of identification, analysis and responding to the uncertainties that emerges during the life period of a project in such a way as to achieve the project objectives by satisfying all the stakeholders (Schwalbe, 2018). Risk management begins during project planning phase. During this process, potential risks are assessed and mitigated. Risk management planning process involves identifying risks and developing mitigation strategies and contingency plans to minimize their impact. According to Kendrick (2019), risk management in a project or organization is dependent on the ability of the team to understand the sources and variations in projects, and then working to minimize threats while maximizing opportunities wherever it is feasible. The objective of project risk management is to increase the likelihood and impact of positive events and decrease the likelihood and impact of negative events on the project. Project risk has its origins in the uncertainty present in all risks.

Project rework contributes to higher project costs in Australia. Rework is one of the main factors contributing to weak performance and productivity in the construction industry in Australia. Reworks contribute to 30% of the total project costs and contribute as much as 50% of a total project cost overrun (Ramon, 2022). Bazin (2020) described risk management as an important practice in project management. These practices include: risk avoidance, acceptance, reduction, and transfer. All stages of the risk management plan should be included in the risk decision for the effective implementation of the process in the project. Vijayan and Sharma (2020) noted that projects handled by many companies in India fail to fail to give proper attention to the risk management aspect and the failure of many projects in the form of time overrun, higher cost and failure to fulfill customer requirements can be attributed to the absence of proper care given to various dimensions of risk management as well as various aspects of risk management practice. In Brazilian companies, Adeleke et al., (2018) demonstrated that adopting risk management practices has a significant positive impact on project performance.

Alsea and Norhayatizakuan (2020) note that the concept of risk management in Oman is relatively new and thus it was not practiced by most contractors then with the exception few and this resulted in poor definition of the project objectives, poor cost estimates and adversarial relationships between these corporations and their clients. Ten years on, however, project risk management scenario in Oman today doesn't seem to have changed much and accordingly project risk management is still a critical issue faced by most of the construction companies in Oman today. Singh and Hong (2020) reported that the majority of construction organizations in Qatar rely on intuition, subjective judgment and practical experience in assessing project risks. Furthermore, it was also found that the risk management practices within these companies were found neither formal nor systematic but very much on adhocor firefighting basis and accordingly their focus in on the avoidance of risk as a process rather than mitigating those circumstances that give rise to the occurrence of risk.

Boateng, Ameyaw and Mensah (2020) revealed some challenges in project management in Ghana. The project managers do not have required skills in internationally recognized systematic risk management practices in order to ensure achievement of value for money in construction project. Tipili and Yakubu, (2018) noted that risks in project management in Nigeria fall into the categories of design, finance, political, and external factors which may be predictable or unpredictable. They assert that these risks are however not considered during bidding, the risks factors lie within the triple constraints of cost, time and quality. Risk management aims at identifying sources of risk and uncertainty, determining their likelihood of occurrence, their impact, and developing appropriate management responses. The construction

industry in Nigeria is subject to more risks due to the unique features of construction activities, such as long period, complicated processes, abominable environment, financial intensity and dynamic organization structures. Mba and Agumba (2020) reported that many construction projects in Nigeria have failed to achieve project success due to increased risk and uncertainties, despite the adoption of risk management process on the projects

The key performance indicators for irrigation programs include increased household income and reduced food scarcity. The key indicators are increased land area brought under irrigation, increased kilometers of rural access road rehabilitated, improved volume of water mobilized, increased crop productivity and reduced postharvest loss. According to Ministry of Water and Irrigation annual report (2019), a big number of Kenyans are hunger stricken and the main way of militating against hunger is through practicing irrigated agriculture so as to increase food production per unit of land since rain-fed Agriculture has become very unreliable due to changing weather patterns and environmental degradation. According to the report, efficiency of irrigation projects is not up to expectations. The irrigation project is one such institution with a devotion to serve the community through addressing development activities that can improve the living standards of the community

Statement of the Problem

Agriculture is fundamental to Kenya's overall economic growth. About 80% of the population lives in rural areas and derives its livelihoods largely from agriculture. Smallholder agriculture dominates the sector contributing 75% of the crops and livestock production. SIVAP has benefitted 896,746 people, 520,113 of whom are women. As a result of project activities, 27,890 metric tons of crop farm produce are under improved post-harvest management, 78 producer-based organizations are stronger, 118,895 people have received improved nutrition services and products, and 84,278 smallholders have received support. As a result, production has improved on 978 hectares of land and has yielded 80,500 metric tons of livestock farm produce. Infrastructure improvements include 273.2 kilometers of roads constructed or rehabilitated and 11 post-harvest agro-processing and quality control facilities installed.

Despite the potential to contribute to food security and poverty alleviation, exploitation of irrigation in Kenya has not translated into project success. The irrigation schemes have only realized 40% of the target production levels and 28% of the expected revenues compared to private operated irrigation schemes. The performance of public irrigation scheme is way off the mark realizing only 40% of the target production levels and 28% of the expected revenues (Ng'eno & Kirui, 2023). Njeru and Kikuchi (2019) added that there is untapped potential in Kenya for irrigation development and the economically feasible potential remains limited. The project costs per unit of irrigated area of Mwea Project is two to four times higher than those of 20th-century counterparts hence not economically viable.

Harrison (2018) found that the public irrigation projects in Kenya have underperformed and rates of the adoption of irrigation technologies are low despite continued donor support. Mati (2018) found that initial investment costs for smallholder irrigation schemes ranged from about US \$198 to \$1744 per ha, which is much lower than reported for large public schemes. Ooro (2018) found that approximately 50% of small holder irrigation schemes in Kisumu County operate below capacity similarly due to the above named challenges, thereby questioning their level of sustainability.

According to National Irrigation Board (NIB, 2022), irrigation projects in Kenya takes longer than planned. Majority of the irrigation projects have missed the targeted implementation deadline for agricultural production over the last five years have risen by 20 %. The cost

overruns of the irrigation schemes increased by 25% over the same period. According to Kisumu CIDP project performance index report of 2022, completion of expansion of land for irrigation through infrastructural development and Rehabilitation of existing infrastructures projects is still at 95.0% completion due to budget overruns. Alal (2019) found that the average performance in the Ahero, West Kano and Bunyala irrigation schemes was 48%, 49% and 56%, respectively. Risk caused by continuous flooding make rice production during drought periods to be very low.

There exists various studies on risk management. Kinyua (2019) on effects of risk management strategies on the project performance of small and medium information communication technology (ICT) enterprises in Nairobi, Kenya revealed that ICT enterprises that manage risk effectively enjoy improved success rates of new projects and better decision making. Aduma and Kimutai (2018) study on effect of project risk management techniques on project performance at National Hospital Insurance Fund (NHIF) in Kenya found risk preventions have the greatest effect on NHIF project performance followed by risk control then risk acceptance while risk transfer having the least effect on NHIF project performance. Ndambiri and Kimutai (2018) on effect of project risk management on performance of health systems Digitalization projects in public hospitals in Nyeri County of Kenya concluded that project risk management was key to influencing the level of project performance. There is however study limitation on risk management practices on performance of irrigation projects in Kenya in the local context. The study hence sought to examine the effect of risk management strategies and performance of small scale irrigation projects in Kenya to bridge the research gap.

General Objective

The general objective was to examine the effect of risk management practices and performance of small scale irrigation projects in Kenya.

Specific Objectives

- i. To establish the effect of risk acceptance on performance of small-scale irrigation projects in Kenya.
- ii. To determine the effect of risk identification on performance of small-scale irrigation projects in Kenya.

Theoretical Review

Uncertainty Theory

The uncertainty theory was proposed by Liu (2010). Uncertainty theory has been proposed as a method for calculating the truth value of an uncertain formula when the truth values of other uncertain formulae are known. Project management does not dismiss the concept of uncertainty. During the early development of activity network approaches such as PERT (Program Evaluation and Review Technique), the possibility of task length fluctuation was recognized in the 1950s. Uncertainty risk influences how project management should approach stakeholder management. Identification of prospective risks that could jeopardize the project, planning of preventative measures to reduce negative outcomes, and the various contingent courses of action that are then triggered by the events are all required for dealing with expected risks. Even with caution, certain threats cannot be totally avoided. As a result, project managers must be prepared for unforeseen events and establish measures to mitigate the harm that risks may cause. The theory hence relates to the objective on risk acceptance in management of irrigation projects.

Prospect Theory

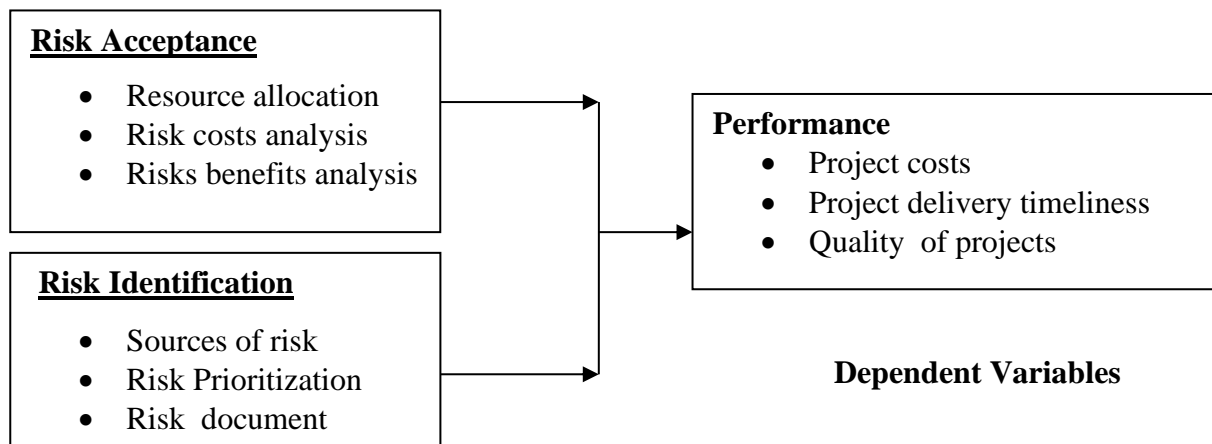
The prospect theory was developed by Tversky and Kahneman (1979). The theory helps in prospect theory helps in decision-making under conditions of risk. Decisions often involve internal conflicts over value trade-offs. This theory is designed to help organizations and

individuals to better understand, explain and predict choices in a world of uncertainty. The theory explains how these choices are framed and evaluated in the decision making process. Prospect theory is descriptive and empirical in nature. It focuses on two parts of decision making: the framing phase and the evaluation phase (Tversky, 1967). The framing phase describes how a choice can be affected by the manner in which it is presented to a decision maker. The evaluation phase consists of two parts, the value function and the weighing function, where the value function is defined in terms of gains and losses relative to the reference point.

Prospect theory is used in decision-making where the decision maker multiplies the value of each outcome by its decision weight. Decision weights not only serve as measures of perceived likelihood of an outcome, but also as a representation of an empirically derived assessment of how people arrive at their sense of likelihood (Tversky & Kahneman, 1979). Risk is an exposure to the possibility of economic or financial loss or gain, or delay as a result of the uncertainty associated with pursuing a certain course of action. When assessing risks in a project, relevant data must be available to enable statistical analysis, otherwise, the experience and knowledge of the decision makers is used to assess the probability of an adverse event. Risks impact projects in a great way by affecting the planned expenses, quality of work and expected project performance. Therefore, risk identification is important in managing projects that are exposed to risks in order to ensure that the objectives of the projects are achieved within the constraints of the project. In case the risks happen, the project managers will have to made solid decisions on how to reduce the risks.

Conceptual Framework

A conceptual framework (Cresswell, 2003) is a graphical representation of the interdependence of variables that depicts a phenomenon inside a process system. Figure 2.1 depicts the conceptualization of the study variables.



Independent Variables

Figure 1: Conceptual Framework

Risk Acceptance

Risk acceptance is the criteria used as a basis or decisions about acceptable risks. Risk acceptance signifies that the project will go on despite the risks and will be closely monitored to ensure that they are managed properly. Accepting project risk implies that the project will proceed despite the risks and will be monitored to ensure that they are adequately managed. The risk acceptance approach is used when other risk response tactics are ineffective or when a response is not warranted by the magnitude of the risk. In order to accept a risk, the project manager and team must also agree to deal with it when it manifests (Ghobadi & Mathiassen, 2018).

Risk acceptance maintains that little risks (risks that do not have the potential to be catastrophic or otherwise unreasonably expensive) are worth accepting with the assumption that any challenges will be addressed as they arise. This kind of trade-off is a helpful tool for budgeting and setting priorities. When a company or person recognizes that the potential cost of preventing a risk is too high to warrant spending money to prevent it, this is known as accepting risk or risk acceptance. Some risks might be accepted, particularly if it is less expensive to leave an asset unprotected from a particular threat than to invest the time (and money) needed to defend it. This cannot be an irrational choice; but, before taking the risk, the risk must be evaluated and all other options must be considered (Nicolas & Steyn, 2020). The project manager must ensure that contingency plans are in place and keep a close eye on the project's progress. This strategy may be useful for small projects with limited scope and resources, or when the risk can be managed in another manner. Risk acceptance works well because the cost of mitigating hazards is sometimes greater than the risk itself. A project manager must be certain that he will be able to control any future risks (Junkman, 2018).

Risk Identification

Risks identification is the process of determining which risks may affect the project and documenting their characteristics (Crispine, 2020). The key benefit of this process is the documentation of existing risks and the knowledge and ability it provides to the project team to anticipate events. Identifying risks is the process of determining which risks may affect the project and documenting their characteristics. The key benefit of this process is the documentation of existing risks and the knowledge and ability it provides to the project team to anticipate events. Identifying project risks is the first step in the Risk Management Program (RMP) usually informal and can be performed in various ways depending on the organization of the project team.

Risk identification process attempts to identify the source and type of risks. Risk identification also involves the recognition of potential risk event conditions in the project and the clarification of risk responsibilities (Macharia, 2020). Risk identification is the basis for analysis and control of risk management and ensures risk management effectiveness. According to Musyoka (2018), risk identification entails the use of various techniques to gain an understanding and determine potential unsatisfactory outcomes that have the likelihood of affecting the project. Risk identification practices are crucial for effective risk management and can have a significant impact on the performance of Public Private Partnership (PPP) projects. Risk identification involves identifying and assessing potential risks that may affect a project, and includes techniques such as meetings with project managers and stakeholders, identifying high risk areas, and breaking down risks according to their severity.

Empirical Literature Review

Risk Acceptance and Project Performance

Ali, Stewart and Qureshi (2020) investigated the risk management practices adopted in Construction industry in Pakistan. The study adopted a descriptive research design. The sample was 40 practitioners, construction managers and construction project team. Questionnaires were used to collect data. Findings showed that the risk acceptance strategies adopted by the construction company influence completion of projects. The study concluded that risk acceptance policies have a strong positive influence on project performance. Ubani, Amade, Benedict, Aku, Agwu, and Okogbuo (2019) investigated effects of risk management measures on construction sector in Nigeria. The study target was 84 contractors, clients, and consultants in the construction business. According to the findings, construction organizations chose to actively

retain risk by buying self-insurance after assessing the cost of potential losses and other risk management options. The study's results also showed that risk acceptance improves the success of construction businesses.

Naktari (2018) examined effect of risk management on performance of humanitarian projects in non-governmental organizations (NGOs) in West Pokot County, Kenya. Questionnaires were used to collect data. The results showed that non-governmental organizations implemented a backup plan to lessen operational, financial, and strategic risks as well as hazard concerns. The survey's results also showed that non-governmental groups used a thorough crisis management strategy and a disaster recovery plan to reduce risks.

Risk Identification and Project Performance

Pimchangthong and Boonjing (2020) study focused on the effects of risk management practices on IT project success in Bangkok Thailand. The data was gathered from 152 project managers (76 from both economies each) using a survey questionnaire. The results confirmed that project planning had a statistically significant impact on project success. Furthermore, risk management significantly moderated the relationship between project planning and project success in the construction businesses despite being in two different economies.

Tworek (2019) study examined the methods of risk identification in companies' investment projects. The study exclusively dealt with the methodological aspects of risk identification in investment projects carried out by companies' and carried out in 25, out of 100, leading construction and assembly companies in Poland. The research was conducted in the third quarter of 2019. The study found that effective identification of the effects of the risk is especially vital as it guarantees increasingly compelling assurance against risks.

Abebe (2021) assessed the practice of project risk management in Bole Arabsa housing project. The study used descriptive research design. Questionnaires were used to collect data. Cluster sampling was used in sampling 259. Questionnaires were used to collect data. Findings showed that irregularity as far as handling of uncertainties that occur within the project. Careful plan is not designed for the projects to overcome or handle uncertain events that may take place. Even though few respondents reported the project use of risk identification such as expert judgment, checklist, document review, information gathering, & assumption analysis, most of them disagree the existence of the practice of these method in the project.

Igihozo and Irechukwu (2022) assessed the risk management process and project performance. The descriptive research design with a mixed qualitative and quantitative approach was used to a sample of 118 respondents selected from 168 target population using stratified sampling technique and Sloven's formula. The results of this research have shown that project risk identification and performance of Mpazi channel construction project has a highly positive and significant relationship.

Gregory, Yusu and Asinza (2019) studied effect of risk management practices on road construction projects performance in Kenya. Structured questionnaires were used to collect data. The target population was 80 project managers, road engineers, project managers, road supervisors, road inspectors, road surveyors and contractors. Simple random sampling was used to select 80 respondents. The findings showed that risk identification has a positive and significant effect on risk management practices in road construction projects.

Mutua and Kirui (2020) examined the extent to which project risk identification influences core banking system projects performance in selected commercial banks, in Kenya. A descriptive

research design was utilized. The accessible population was 80 respondents comprising of 10 project managers from each bank. A census of 80 respondents was done to form the study sample size. Questionnaires were utilized to collect data. The collected data was quantitatively analyzed using descriptive statistics and multiple regression analysis. The study found that risk identification, risk analysis, risk response and risk monitoring had a positive significance on project performance. The study concluded that identifying risk enables full risk analysis to be done and risk to be addressed and the project managers qualify risk based on likelihood and impact.

RESEARCH METHODOLOGY

The study employed a descriptive research design. Descriptive research usually aims at collecting data that describes characteristics of persons, situations or events. According to Creswell and Clark-Plano (2020), the descriptive survey is a method of collecting information by administering a questionnaire to a sample of research participants. The study targeted 24 public and private small scale irrigation projects implemented in Kenya. The Project were implemented by a Project Coordination Unit (PCU) within the Ministry of Agriculture, Livestock and Fisheries. The Ministry has extensive experience in implementing such projects and are responsible for the Coordination, implementation and technical supervision of project activities in addition to the procurement, financial management and Monitoring and Evaluation (M&E). The unit of observation will be 172 personnel involved in the implementation of the irrigation projects; the PCU chairpersons, the counties' ministry of water and irrigation officials, project management committee members, and block leaders.

The sampling frame is an entire list of every object in the populace that a researcher aims at studying. The sampling frame for this study was 24 small scale irrigation projects in Kenya. The sample size of was determined using census since the study population is less than 200. This sampling method allows a researcher to focus on a limited number of informants that is selected purposively from the population to get the required information to carry out the study in order to get optimal information. The sample size was hence be 172 respondents. The study used primary data. This data was collected using questionnaires. Mugenda (2013) recommended that 10% of the sample size is adequate for piloting. The study therefore carried out a pilot test with 17 senior staff involved in management of irrigation projects. After the pilot test, changes were made in the questionnaire to ensure that the content was both valid and reliable.

Ader (2008) defined data analysis as a process of editing, cleaning, transforming, and modeling data, to highlight useful information, suggestions, and conclusions. Data was analyzed using SPSS Version 28. Descriptive and inferential statistics were used. The descriptive statistics included frequency, percentage, and mean while inferential statistics included correlation and regression.

RESEARCH FINDINGS AND DISCUSSIONS

Risk Acceptance

The first objective sought to establish the effect of risk acceptance on performance of small scale irrigation projects in Kenya. Respondents were asked to tick on degree to which they agree/disagree with listed statements on risk acceptance. Findings are presented in Table 4.1.

Table 1: Risk Acceptance*Key: Strongly disagree (SD), Disagree (D), Not Sure (NS), and Agree (A), strongly agree (SA)*

Statements	SD		D		N		A		SA		M
	F	%	F	%	F	%	F	%	F	%	
Enough resources are allocated to the irrigation projects	21	16.2	71	54.6	6	4.6	32	24.6	0	0	2.38
Costs of possible risks are analyzed	2	1.5	3	2.3	8	6.2	81	62.3	36	27.7	4.12
The benefits and losses for risks are evaluated frequently	4	3.1	6	4.6	5	3.8	25	19.2	90	69.2	4.47
The project managers take no action on risks even when they have an impact on the project	93	71.5	28	21.5	3	2.3	6	4.6	0	0	2.42
The farm managers promotes the use of alternate plans to prevent any situations that cause project delays	3	2.3	17	13.1	14	10.8	24	18.5	72	55.4	3.88
The project manager has enough knowledge on risk analysis process	85	65.4	35	26.9	3	2.3	7	5.4	0	0	2.45
The management is continuously updated on the expected risks and retention tactics	0	0	9	6.9	7	5.4	74	56.9	40	30.8	4.42
Utilizing the right technologies facilitates accepting and retaining risks	0	0	12	9.2	3	2.3	87	66.9	28	21.5	3.99

N=130

Findings show that respondents strongly agreed that the benefits and losses for risks are evaluated frequently (M=4.47), and the management is continuously updated on the expected risks and retention tactics (M=4.42). Respondents agreed that the costs of possible risks are analyzed (M=4.12), utilizing the right technologies facilitates accepting and retaining risks (M=3.99), and the farm managers promotes the use of alternate plans to prevent any situations that cause project delays (M=3.88). Respondents disagreed that the project manager has enough knowledge on risk analysis process (M=2.45), project managers take no action on risks even when they have an impact on the project (M=2.42), and enough resources are allocated to the irrigation projects (M=2.38).

Findings imply that majority of the project managers take actions when risks happens. These actions include analyzing the costs of the risks and their effect on the project. The managers also use right technology to facilitate acceptance and retention of project risks. Managers also make effective use of contingency plans to prevent situations that may cause project delays. The respondents however feel that majority of the project managers lack adequate risk analysis skills, other take no action when risks occur and the resources allocated to the irrigation projects are inadequate. Findings are in support of Ali, Stewart and Qureshi (2020) that the risk acceptance strategies adopted influence completion of projects.

Risk Identification

The second objective sought to determine the effect of risk identification on performance of small scale irrigation projects in Kenya. Respondents were asked to tick on degree to which they agree/disagree with listed statements on risk identification. Findings are presented in Table 4.2.

Table 2: Risk Identification*Key: Strongly disagree (SD), Disagree (D), Not Sure (NS), Agree (A), Strongly agree (SA)*

Statements	SD		D		N		A		SA		M
	F	%	F	%	F	%	F	%	F	%	
Early identification of project risks and taking measure affect project completion	0	0	12	9.2	3	2.3	87	66.9	28	21.5	4.21
Project manager is able to recognize and identify the root causes of risks	0	0	1	0.8	2	1.5	95	73.1	32	24.6	4.77
Effective risk identification process enable project managers to take measures that save project costs	0	0	1	0.8	0	0	41	31.5	88	67.7	4.32
Effective risk identification process enable project managers to institute corrective measures that influence project costs	0	0	6	4.6	12	9.2	86	66.2	26	20.0	4.00
There is systematic approach on risk management in the project	57	43.8	31	23.9	18	13.8	12	9.2	12	9.2	1.84
An expert judgment or meetings are considered while planning for risks that might occur in the project	4	3.1	12	9.2	1	0.8	24	18.5	89	68.5	4.53

N=130

Findings show that respondents strongly agreed that; project manager is able to recognize and identify the root causes of risks (M=4.77), effective risk identification process enable project managers to take measures that save project costs (M=4.32), an expert judgment or meetings are considered while planning for risks that might occur in the project (M=4.53), early identification of project risks and taking measure affect project completion (M=4.21). Respondents further agreed that effective risk identification process enable project managers to institute corrective measures that influence project costs (M=4.00). Respondents disagreed that there is systematic approach on risk management in the project (M=1.84).

Findings imply that the project managers are able to identify the most likely risks that may affect irrigation projects. Risk identification has enabled project managers to take measures that saves project costs. The project managers also seek professional assistance while planning for risks to offer professional advice on the best methods of risk identification. Risk identification help project managers to adequately plan for risks that may occur during project implementation. There is no systematic approach on risk management. Findings are in agreement with Mutua and Kirui (2020) that identifying risk enables full risk analysis to be done and risk to be addressed and the project managers qualify risk based on likelihood and impact.

Project Performance

Various measures were used to determine performance of irrigation projects. Respondents were asked to tick on degree to which they agree/disagree with listed statements on project performance. Findings are presented in Table 4.3

Table 3: Project Performance

Key: Strongly disagree (SD), Disagree (D), Not Sure (NS), Agree (A), Strongly agree (SA)

Statements	SD		D		N		A		SA		M
	F	%	F	%	F	%	F	%	F	%	
The projects meet time objective	90	69.2	33	25.4	6	4.6	1	0.8	0	0	1.56
Projects are implemented within set budget	107	82.3	10	7.7	6	4.6	7	6.4	0	0	1.36
Project sponsors are satisfied	0	0	12	9.2	1	0.8	103	79.2	14	10.8	4.58
Project realizes its benefits	10	7.7	10	7.7	11	8.4	24	18.4	75	57.7	4.72
Project beneficiaries are satisfied	0	0	6	4.6	15	11.5	21	16.1	88	67.7	4.33

N=130

Findings show that the respondents strongly agreed that project realizes its benefits (M=4.72) Project sponsors are satisfied (M=4.58), and project beneficiaries are satisfied (M=4.33). The respondents strongly disagreed that the projects meet time objective (M=1.56), and projects are implemented within set budget (M=1.36). The findings imply that the projects face costs and time overruns. The projects however meet desired quality hence the beneficiaries and sponsors are satisfied. Findings are in agreement with Ng'eno and Kirui (2023) that performance of public irrigation scheme is way off the mark realizing only 40% of the target production levels and 28% of the expected revenues.

Correlation

The study employed Pearson correlation to assess the strength of the relationship between the independent and dependent variables. The relationship was considered significant at a p value of <0.05. A Pearson correlation (r) value of ± 0.5 shows a strong correlation, ± 0.30 to ± 0.49 moderate correlation while ± 0.29 is a small correlation. Significance is at less than 0.05 (Wong & Hiew, 2019). Pearson correlation results are presented in Table 4.4.

Table 4: Coefficient of Correlation

Variables		Performance	Acceptance	Identification
Project performance	Pearson Correlation	1		
	Sig. (2-tailed)			
Acceptance	Pearson Correlation	.933**	1	
	Sig. (2-tailed)	.000		
Identification	Pearson Correlation	.901**	.890**	1
	Sig. (2-tailed)	.000	.000	

** . Correlation is significant at the 0.05 level (2-tailed).

According to findings in Table 4, there is a strong significant relationship between risk acceptance and project performance ($r=0.933$, $p=0.000$) and a strong significant relationship between risk identification and project performance ($r=0.901$, $p=0.000$).

Findings are in support of other scholars that also found a significant relationship risk management practices and project performance; Ike and Gift (2020) found that projects risk avoidance was positively and significantly related to all four components of project execution, Ali, Stewart and Qureshi (2020) that risk acceptance policies have a strong positive influence on project performance, Gregory, Yusu and Asinza (2019) that risk identification has a positive and significant effect on risk management practices in road construction projects, and Njuguna (2019) that risk transfer is significantly affect project performance.

Regression Analysis

Regression analysis was conducted to understand how a unit change in the independent variable (risk acceptance and identification) may cause a change in the dependent variable (performance of irrigation projects). The coefficient of determination shows how a statistical model is expected to predict future results. Table 5 presents the Model Summary.

Table 5: Model Summary

Model	R	r ²	Adjusted r ²	Std. Error of the Estimate
1	0.954	0.911	0.908	.145

Predictors: (constant) risk acceptance and identification

The results in table 5, show that adjusted R squared was 0.911 implying that there was 91.1% variation of performance of performance of irrigation projects was due to the changes in risk acceptance and identification. This means that other project risk management practices that this study did not focus on contribute to 8.9% of project performance. An analysis of variance was performed on the relationship between independent variables and dependent variable. ANOVA results are presented in Table 6

Table 6: Analysis of Variance

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	26.682	2	13.341	635.28	.000 ^b
	Residual	2.621	127	.021		
	Total	29.302	129			

Predictors: (constant) risk acceptance and identification

Project performance

The ANOVA tests whether the overall regression model is a good fit for the data. The table shows that the independent variables (risk avoidance, acceptance, identification, and risk transfer) statistically significantly predict the dependent variable (performance of irrigation projects), $F(2, 127) = 635.28, p < .0005$ (the regression model is a good fit of the data).

Multiple regression shows how a change in the independent variable would predict a unit change in the dependent variable. Table 7 presents the regression coefficients.

Table 7: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant/Y Intercept	.638	.172		3.709	.000
Acceptance	.722	.049	1.050	14.748	.000
Identification	.643	.067	.629	9.622	.000

As per the SPSS generated in Table 7,

$$\text{Project performance} = 0.638 + 0.722X_1 + 0.643X_2$$

The findings from the study reveal significant relationships between various risk management practices and project performance in small-scale irrigation projects in Kenya. Holding risk

avoidance, acceptance, identification, and transfer constant at zero, the baseline project performance would be at 0.638.

On the other hand, a unit change in risk acceptance was found to have the highest significant impact on project performance ($\beta = 0.722$; $t = 14.748$; $p = 0.000$). This finding underscores the crucial role of risk acceptance strategies in enhancing project performance, as highlighted in studies by Ali, Stewart, and Qureshi (2020) and Ubani et al. (2019), which emphasized the positive influence of risk acceptance policies on project success in different contexts.

Similarly, a unit change in risk identification was found to cause a significant change in project performance ($\beta = 0.643$; $t = 9.622$; $p = 0.000$). This emphasizes the importance of effective risk identification practices in improving project outcomes, as supported by research such as that by Tworek (2019) and Igihozo and Irechukwu (2022), which highlighted the vital role of risk identification in providing assurance against risks and enhancing project performance.

Conclusion

Risk acceptance affects project performance. The project managers accept the project risks through allocation of resources though they are not enough which may affect project budget. The project managers carefully evaluate the benefits and losses or risks before taking action on risky situations. Some risks may be beneficial while others may cause losses to the projects. Technology is also used to facilitate risk acceptance and where possible managers use alternative plans to prevent any situation that may cause project delay. Majority of the project managers lack risk analysis skills and may find it very challenging to accept risks.

Risk identification affects project performance. Prior identification of project risks enables the project managers to adequately plan or the risks. The projects have the ability to identify the main causes of project risks and also apply effective risk identification processes that enable project managers to save on project costs. The project managers do not make decision regarding risk identification in isolation, rather they consult professional in irrigation projects to gain more insights on the most probable risks that they may encounter.

Recommendations

The Ministry of Agriculture, Livestock and Fisheries should organize training program for the agricultural officers that oversee implementation of the irrigation projects. This will equip the officers with adequate skills on risk management including how to deal with risks when they encounter them. Adequate miscellaneous resources should be allocated during budgetary planning. This will enable project managers to take actions when risks occur and still avoid budget overruns.

Professional should involve professionals in management of irrigation projects. The professionals will offer guidance on the possible risks and how to identify them. Identification of the root causes of risks may greatly help in preventing the risks from occurring. There should also be systematic approach on risk management in the project.

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