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PROJECT INTEGRATION STRATEGIES AND SUSTAINABILITY OF WATER PROJECTS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

Project integration strategies are the processes of coordinating all aspects of project planning and consolidating and following-up processes to meet the expectations of clients and stakeholders. Project integration ensures the proper coordination among project activities. The general objective was to examine effect of project integration strategies on sustainability of water projects in Nairobi City County, Kenya. The study specifically focused on replication strategy and pioneering strategy. The study was guided by organizational learning theory, and diffusional of innovation theory. The study targeted 39 government funded water projects in Nairobi County. The study targeted 321 respondents. Yamane sampling formula was used to sample 178 respondents. Primary data was collected using questionnaires. Pilot study was conducted with 10% of the sample hence 18 respondents. The study used content and construct validity. Cronbach's Alpha Coefficient was used to test reliability. The data was then cleaned and analyzed using descriptive statistics (frequency, percentage, mean) and inferential statistics (correlation, and regression). Data was tabulated. Findings show that; a moderate significant relationship between replication strategy and project sustainability (r=0.497, p=0.000), a strong significant relationship between pioneering strategy and project sustainability (r=0.574, p=0.000). The recommendations are; the project managers should involve all project stakeholders in the project, the project managers should communicate effectively with stakeholders, Project managers should perform and schedule realistic project duration using detailed work break down structure and by using various modern software's, The project managers should have flexible project designs.

Key Words: Project Activities, Project Integration Strategies, Sustainability, Replication Strategy, Pioneering Strategy

Background of the Study

Project integration strategies are the processes of coordinating all aspects of project planning and consolidating and following-up processes to meet the expectations of clients and stakeholders (Heldman, 2018). Project integration strategies are recognized as specific tools and methods to integrate the information, organization, processes or systems of project teams (Hall &Levitt, 2018). The project integration strategies can be identified as formal or informal. Formal project integration strategies concern, contractual arrangements whilst informal project integration strategies relate to the project culture and team behaviour. Project integration ensures the proper coordination among project activities. Therefore, the impact of integration management on project success should be well understood so that project managers might benefit from the positive aspects of properly coordinated project activities. The integrated delivery approach contributes to reducing the costs of design changes since the ability to impact cost and functional value is cheaper during the early stages of the project. Design changes that normally occur during the implementation phase in traditional delivery methods become more expensive since most of the design work is already set (Liu et al., 2015).

The exploration strategy matters most for each type of project as it helps managers better allocate resources. Exploration helps to identify a need, problem, or opportunity (Ahuja, 2016). According to Magsaka, and Geronimo (2020), replicating the project means finding other places or problems where you can leverage the key lessons from successful project. This may be applying the same solution to an identical issue occurring in another similar projects. Replicating projects also means having to be open, having to compromise with other actors, and not putting individual interests above the interests over others (Inkeri & Tim 2021). Pioneering means being ahead by introducing a new product or innovation into operations. Project managers must coordinate all o knowledge areas throughout a project's life cycle. As the project progresses, project team gains more knowledge, and this leads to scope changes. Scope change is common on projects, meaning that it is not a harm to make changes during the lifecycle of the project (Rugenyi, 2015). Teams must adapt, but they can't lose track of the ultimate goals of the project. Teams should constantly evaluate progress. In spite of efforts to increase water access, many water projects have either stopped operating or are not operating optimally. Although many water projects are funded by government or non-governmental organizations, many of the dysfunctional water projects are operated and managed by community-based organizations such as Community Water and Sanitation (WASH) Committees, Water User Associations (WUA) or Women groups.

Statement of the Problem

Water remains a critical requirement for the survival of human beings. Provisions of Safe Water for drinking and sanitation are the bare minimums in deliverable by a nation to its people but remain a sparse commodity in both Rural and Urban areas. Lack of access to safe water for drinking and use (cooking, bathing, and cleaning) is also a significant cause of societal problems associated with increasing poverty levels. Water projects in Kenya have been experiencing various challenges related to project performance and sustainability (Maimuna & Kidombo, 2017). Kariuki (2019) noted that for most water projects in Kenya, operations stop shortly after the exit of the financiers.

In the last five years, the national government and the County government of Nairobi have invested heavily on water projects. Boreholes are the main water projects especially in urban settlements but the failure rate is estimated at 20% (Department of geology University of Nairobi, 2021). The boreholes fail to produce water or the water produced does not meet quality standards (County Integrated Development Plan, 2018). In Kenya, approximately 30% of the water supply projects are out of service due to poor maintenance (WaterAid, 2020). Out of the 1044 water supply projects implemented by the Nairobi City Water & Sewerage Company (NCWSC) in low-income areas of

the County in 2018, 303 (29%) projects are not operational (NCWSC- Informal Settlements Region, 2018). Nyakwaka, Muronga, and Muvumb (2018) noted that it is a common trend in Kenya to observe nonfunctional water systems just a few years after implementation. About 25-30% of recently completed water projects in the urban settlements in Nairobi County become dysfunctional within the first three years of completion whereby the water pumps broke down and were not amended on time leading to complete wear out.

There exist some studies on project sustainability in Kenya. Chepng'eno and Kimutai (2021) study on project integrated management skills on sustainability of road projects found that project planning and resource allocation had positive significant relationship with project sustainability. Gachie (2019) on risks and problems influencing project sustainability revealed a low level of commitment to sustainability by project teams. Onkoba (2016) on determinants of sustainability of the community based projects in Kenya concluded that resource support, project design, operational maintenance significantly influence sustainability of community based projects. Boruett and Musembi (2022) on project integration management and implementation of mobile telecommunication network projects in Kenya found that project integration management practices were critical in the implementation of mobile telecommunication network projects. There is however study limitation on project integration and sustainability of water projects. The study therefore sought to determine the the effect of project integration strategies on sustainability of water projects in Nairobi City County, Kenya.

Objectives

Specific Objectives

i. To examine effect of replication strategy on sustainability of water projects in Nairobi City County, Kenya.
ii. To assess effect of pioneering strategy on sustainability of water projects in Nairobi City County, Kenya.

LITERATURE REVIEW

Theoretical Review

Organizational Learning Theory

Organization learning theory was developed by Argyris and Schon (1978) who suggested that learning takes place through the process of detecting and correcting errors. A learning organization is the term given to an organization or a firm that facilitates the learning of its members and continuously transforms itself. Learning organizations develop as a result of the pressures facing modern organizations and enables them to remain competitive in the business environment. A learning organization has five main features; systems thinking, personal mastery, mental models, shared vision and team learning. The learning organization concept encourages organizations to shift to a more interconnected way of thinking. Organizations should become more like communities that employees can feel a commitment to and therefore will work harder (Serenko, Bontis & Hardie, 2007).

Organizational learning theory argues that, in order to be competitive in a changing environment, organizations must change their goals and actions to reach those goals (Janz & Prasarnphanich, 2003). However, for learning to occur, the firm must make a conscious decision to change actions in response to a change in circumstances, consciously link action to outcome, and remember the outcome. Organizational learning has many similarities to psychology and cognitive research because the initial learning takes place at the individual level: however, it does not become organizational learning until the information is shared, stored in organizational memory in such a way that it may be transmitted and accessed, and used for organizational goals (Cha, Pingry & Thatcher, 2008). Key lessons from previous errors in project management enables project

managers to improve on current projects which enhances project success. Project errors could also be solved through knowledge sharing and improving the capacity of project resources.

Diffusion of Innovation Theory

The theory of Diffusion of Innovation was developed by Everett Rogers (1962). The theory states that innovation is communicated often among the participants in social system through the process of diffusion (Akbari, Sohrabi & Zanjani, 2012). The theory also tends to explain how developments of new ideologies or innovations are adopted by various organizations to ensure they achieve anticipated outcomes. Rodgers Diffusion Theory proposes that there are five attributes of technological innovation and they include: compatibility, complexity, relative advantages, trialability as well as observability. Moreover, Rogers suggested that categorization of innovations are based on their simplicity and complexity continuum with qualification that the meaning of the innovation may not be clearly understood by potential adopters. Technological innovation is more adoptable in case there is observable outcome which is of substantial importance to the adopter. With regard to relative advantages, integration of information technology such as electronic record management tends to enhance performance of water projects by improving on security of data as well as accessibility of records. Pioneering innovation is based on a new technology, a new advancement in the that leads project success.

Conceptual Framework

A conceptual framework is a basic structure which the researcher believes can best explain the natural progression of the phenomenon to be studied (Adom et al., 2018). A conceptual framework enables the researcher to find links between existing literature and his own research goals. The framework shows the independent and dependent variables as well as the indicators to measure study variables.

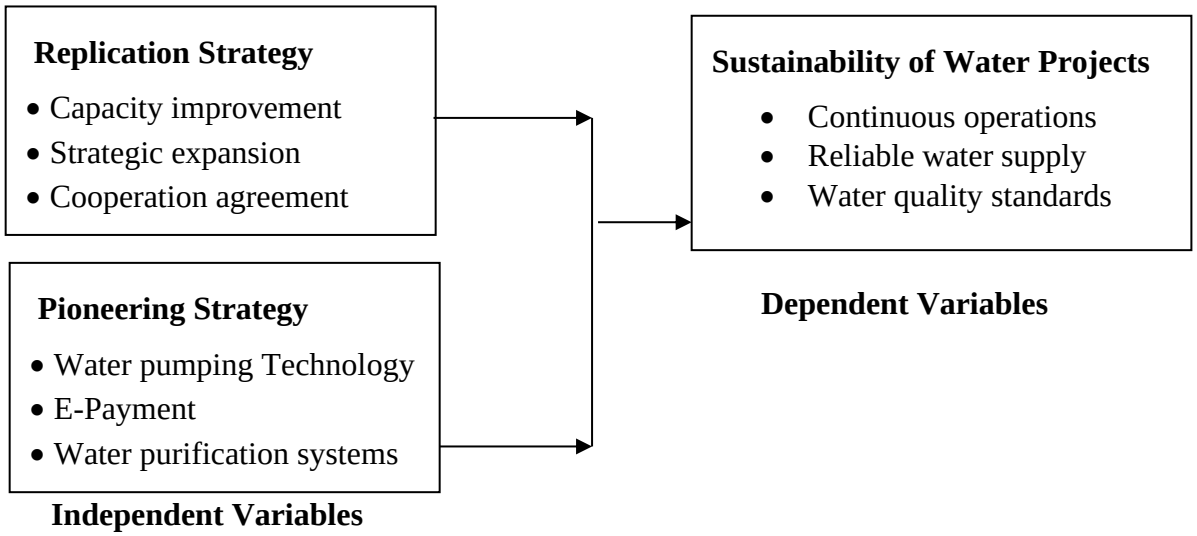

Figure 2.1: Conceptual Framework

Replication Strategy

Replication is a strategy whereby organisations deliberately try to reproduce the success they have enjoyed in some limited setting or locale. Implementing a replication strategy requires knowledge of the valuable traits that needs to be replicated, the methods by which such traits are replicated, and the kind of environments where outlets with such traits can successfully operate (Winter & Szulanski, 2021). Capacity improvement is the process whereby people, organizations and

society as a whole unleash, strengthen, create, adapt, and maintain capacity over time. Capacity gaps are identified by first defining the essential capacities at different levels for achievement of policy or organizational or programme goals and objectives. Strategies and actions in capacity building are tailor-made for each situation on the basis of identification of capacity gaps (Adeyemi, & Idoko, 2018).

Expansion strategy is a corporate level strategy that is centered on expanding the business unit to widen the scope in different ways. It is a comprehensive plan that outlines the steps that an organization, business, or team must take in order to expand their operations and grow their business. It includes specific objectives, actions, and measures that must be taken in order to reach a desired outcome. This type of plan is often used to identify and prioritize opportunities and resources, set measurable goals and objectives, and track progress towards those goals (Avedi, 2020). Project Cooperation Agreement (PCA) means the agreement to be entered into between the stakeholders for a specific project. A project cooperation agreement is a contract between two or more parties who agree to unite to achieve a common interest or complete a common project. The contract states who each party is, what their roles and responsibilities are under the agreement, and what common goal or project they are to work together toward. The purpose of the project cooperation agreement is to assign specific duties to each contract party, which helps to better organize their efforts. It also ensures that if a party fails to uphold their contract obligations, legal recourse is warranted (Park, 2019).

Pioneering Strategy

Pioneering means being ahead of the competitors by introducing a new product or innovation into the market first. Pioneers gain advantage by making first moves in technology, product or marketing innovation. These advantages are called first-mover advantages. Other enterprises are followers and they aim to maximize the late-mover advantages and to minimize late-mover disadvantages (Eleonor, 2016). Operation and maintenance refers to all of the activities needed to run a water supply project. The overall aim of operation and maintenance is to ensure efficiency, effectiveness and sustainability of water projects. Operation and maintenance activities which include not only technical issues, but also managerial, social, financial must be directed towards the elimination or reduction of the major constraints which prevent the achievement of sustainability (Rugenyi, 2015).

Payment automation is a type of solution that integrates payment processes so that a business can take a hands-off approach to managing their accounts payables and paying their suppliers. It is aimed at automating and optimizing procedures and competencies that were initially performed by humans (Dyer, 2015). Reverse Osmosis (RO) is a type of filtration that uses a semi-permeable, thin membrane with pores small enough for pure water to pass through, while rejecting larger molecules and other contaminants. In addition to removing contaminants and sediments, RO can also remove microorganisms (Tuser, 2021).

Empirical Review

Replication Strategy and Project Sustainability

Singh (2017) explored the role of collaboration in IT projects. The study target was 176 IT projects in a telecommunication firm. Results showed that project collaboration have a strong influence on sustainability of IT projects. Muhammad and Mustafa (2019) studied effect of management competence of performance of public mega projects in Pakistan. Data was collected using questionnaires. Results revealed that management competency had both positive and negative effects on project performance. Leadership and management skills, communication, technical competence, ethics, and honesty had a strong impact on project management. Vahid, Sara, and Raju (2019) studied impact of communication through collaboration on construction

projects performance in Indonesia. The study adopted a descriptive research design. Results showed that a positive and significant relationship between formal and willingness to communicate with project collaboration. Project collaboration had an impact on project sustainability.

Löfgren and Eriksson (2019) investigated how collaborative tools affected project outcome in Sweden. The study target was 106 construction clients in Sweden. Results showed a positive relationship between collaboration and project outcome. Therefore, joint activities were crucial for successful projects. Yaseen (2020) studied effect of project collaboration on project management. The study target was 170 respondents. Results showed that the project managers employed different project based collaboration strategies which had an effect of project success. Ouma (2016) examined influence of capacity building programs on project performance in non-governmental organizations. The findings established that training methodology was a key contributor to project performance. Project performance was influenced by the curriculum content of a capacity building program.

Ngaira, and Malenya (2019) investigated the influence of technical capacity on road construction projects performance in Busia County, Kenya. The study targeted 123 project officers. Data was collected by structured questionnaires. The study concluded that technical capacity significantly influences performance of road construction projects. Improvement in the road contractors' technical capacity yielded a significant progress in performance of road construction projects in Busia County. Kanyi and James (2023) assessed effect of capacity building on the success of projects funded by donors in Nairobi County. A descriptive survey design was adopted. The target population was 55 donor-funded projects. Results revealed that there is a positive and significant influence of capacity building on project success. Staff training was in place but it was not consistent and there was no policy to govern it.

Pioneering Strategy and Project Sustainability

Joshi (2021) discussed the role of technology in project life cycle and performance. The showed that companies were underutilizing the technologies in the project execution and management. Lundin (2016) investigated the main challenges facing project managers in Sweden. A qualitative research was adopted. Data was collected using interview guides. The project managers had a positive attitude towards technological adaption but the organization as a whole was more reluctant. The main challenges concerned the organizational structure and that the decision paths were too long and slow. Hosford (2017) examined the degree to which project management competence affected success of IT projects. The study adopted a correlational methodology. The study population was project managers. Results showed a significant correlation of competency, project management experience, and technical experience with project success.

Khatatbeh (2016) examined impact of technology on developing directions of building constructions in Jordan. Study results showed that there is a statistically significant impact of technology on project management and design of constructions. Technology enhanced speed of project completion and had a significant impact on project budget and cost as well as project sustainability. Camngca, Amoah, and Ayesu (2022) investigated causes and effects of IT underutilization in the building sector in South Africa. The study adopted a qualitative research approach. Findings showed lack of understanding of existing and newly available ICT software and hardware technology among staff within the building technology due to lack of digitalisation in construction projects implementation, inadequate system upgrades, lack of adequate ICT resources, lack of financial resources for internet and software application subscriptions and lack of ICT training leading.

Magaba and Cowden (2016) investigated impact of technological changes on the construction industry in South Africa. Findings showed that the implementation of ICT tools greatly improves the delivery of projects, but more needs to be done to improve the adoption of ICT by employees

and organizations. Olaniyan (2019) studied factors influencing IT adoption in Nigerian construction organizations. Semi-structured interviews were conducted with respondents. Results showed that most building technology is not produced in the county rather it is imported. The key barrier is government policy on custom fees and the cost of clearing at the port of entry. The fees and clearing cost are higher in Nigeria and is not encouraging adoption of new technology for the efficient delivery of construction projects. Yasin (2019) assessed impact of information technology on project success in Somalia. The study used both quantitative and qualitative methods for data collection. The findings revealed that use of IT had facilitated better data and knowledge management for the organization, IT had improved operational efficiency of employees, and IT had also improved accountability for the organization and in quality project delivery to its stakeholders.

RESEARCH METHODOLOGY

The study employed a descriptive research design. Descriptive survey research design is a method of collecting information by interviewing or administering a questionnaire (Saunders et al, 2009). The study targeted government funded water projects in Nairobi City County. As at December 2022, there were 39 complete water projects funded by county government in collaboration with donors. The 39 water projects were the study unit of analysis while the unit of observation was the 137 project managers,112 project coordinators, and 72 billing officers that supervise the billing of the water projects. The sample size was determined using Yamane Formula. Using the formula the sample was 178 respondents. The study used stratified random sampling technique which is as a method of sampling that involves the division of a population into smaller groups known as strata. Questionnaires were used to collect primary data. Pilot study was conducted with 10% of the sample as recommended by Wilkinson (2012). Therefore the study sampled 18 respondents who did not take part in the actual study. After data collection, it was sorted, coded, and keyed into SPSS Version 28. The data was then cleaned and analyzed descriptive statistics (frequency, percentage, mean) and inferential statistics (correlation, and regression). Data was presented using tables. The regression equation was used.

RESEARCH FINDINGS AND DISCUSSION

The sample size was 178 respondents and 18 were used for piloting and did not take part in the actual study. Questionnaires were hence administered to 160 respondents and 124 questionnaires were successfully answered hence a response rate of 77.5%. This is an adequate response rate as recommended by Fincham (2008) that a response rate of 60% and above should be the target of every social science researcher.

Replication Strategy

The first objective sought to examine effect of replication strategy on sustainability of water projects in Nairobi City County, Kenya. Respondents were asked to tick on the extent to which they agree/disagree with statements related to replication strategy. Findings are shown in Table 1.

Table 1: Replication Strategy

Key: SD=Strongly disagree, D=Disagree, NS=Not Sure, A=Agree, SA= Strongly agree, M=Mean.

Statements	SD		D		N		A		SA		M
	F	%	F	%	F	%	F	%	F	%	
The project team is regularly trained	20	16.1	60	48.4	14	11.3	20	16.1	10	8.1	2.52
Project team conducts bench marking on other successful water projects	16	12.9	8	6.5	4	3.2	69	55.6	27	21.8	3.67
Monitoring reports are used to correct project errors to enhance sustainability	7	5.6	10	8.0	16	12.9	62	50.0	29	23.4	4.17
Project manager hire competent project team members	14	11.3	14	11.3	19	15.3	59	47.6	18	14.5	3.57
There is effective communication with project stakeholders	69	55.6	23	18.5	3	2.4	17	13.7	12	9.7	2.57
Same solutions are employed to solve other related water project problems	4	3.2	3	2.4	2	1.6	81	65.3	34	27.4	4.11
Community members cooperate with project managers in project management	7	5.6	15	12.1	16	12.9	43	34.7	43	34.7	3.81

N=124

Findings show that the respondents agreed that; monitoring reports are used to correct project errors to enhance sustainability (m=4.17), same solutions are employed to solve other related water project problems (m=4.11), community members cooperate with project managers in project management (m=3.81), project team conducts bench marking on other successful water projects (m=3.67), and project manager hire competent project team members (m=3.57). The respondents disagreed that there is there is effective communication with project stakeholders (m=2.57), and the project team is regularly trained (m=2.52).

Findings imply that the project managers apply replication strategy to enhance project performance. The replication strategy include using reports from previous projects to improve on current projects, regular monitoring and evaluation of water projects, collaborating effectively with the community members, benchmarking, and hiring competent project team members. There is however poor communication with project stakeholders, and no regular training to the project team. Findings are in agreement Ngaira, and Malenya (2019) that technical capacity influences performance of road construction projects. Improvement contractors' technical capacity yielded a significant progress in performance.

Pioneering Strategy

The second objective sought to assess effect of pioneering strategy on sustainability of water projects in Nairobi City County, Kenya. Respondents were further asked to tick on the extent to which they agree/disagree with statements related to pioneering strategy. Findings are shown in Table 2

Table 2: Pioneering Strategy

Statements	SD		D		N		A		SA		M
	F	%	F	%	F	%	F	%	F	%	
There is effective use of operations and maintenance technology	6	4.8	9	7.3	11	8.9	69	55.6	29	23.4	3.85
Technology enhances quick fixing of technical hitches	1	0.8	16	12.9	2	1.6	78	62.9	27	21.8	3.92
The payment systems are fully automated	34	27.4	48	38.7	9	7.3	21	16.9	12	9.7	2.57
Project automation has enhanced accountability and transparency	4	3.2	16	12.9	3	2.4	69	55.6	32	25.8	3.88
Reverse Osmosis is used to ensure safe drinking water	29	23.4	66	53.2	13	10.5	11	8.9	5	4.0	2.43
Technology is used to monitor water usage	51	41.1	44	35.5	9	7.3	10	8.1	10	8.1	2.06
Technology is employed in record keeping to efficiently track project operations	45	36.3	68	54.8	2	1.6	7	5.6	2	1.6	2.19

Results show that the respondents agreed that; technology enhances quick fixing of technical hitches (m=3.92), project automation has enhanced accountability and transparency (m=3.88), and there is effective use of operations and maintenance technology (m=3.85). Respondents disagreed that; the payment systems are fully automated (m=2.57), Reverse Osmosis is used to ensure safe drinking water (m=2.43), technology is employed in record keeping to efficiently track project operations (m=2.19), and technology is used to monitor water usage(m=2.06). Findings imply that project automation enhances accountability and transparency. Although there is effective use of operations and maintenance technology, only a few projects use reverse osmosis which implies that the water available in the projects may not be very safe for drinking. The records are filled manually which may lead to accountability challenges. Findings are in agreement with Camngca, Amoah, and Ayesu (2022) who also found lack of digitalisation in construction projects, inadequate system upgrades, lack of adequate ICT resources, lack of financial resources for internet and software application subscriptions and lack of ICT training leading.

Project Sustainability

The researcher sought to find whether the water projects are sustainable. Respondents were asked to indicate the extent to which they agree/disagree with statements related to adaptation strategy. Findings are shown in Table 3.

Table 3: Project Sustainability

Statements	SD		D		N		A		SA		M
	F	%	F	%	F	%	F	%	F	%	
Water projects are regularly inspected	2	1.6	4	3.2	11	8.9	75	60.5	32	25.8	4.06
The water projects are reliable	3	2.4	10	8.1	3	2.4	76	61.3	32	25.8	4.00
Funds generated from the projects cater for operation and maintenance	19	15.3	79	63.7	4	3.2	19	15.3	3	2.4	2.00
The water quantity is satisfactorily	23	18.5	83	66.9	10	8.1	8	6.5	0	0	2.44
Clean and safe drinking water is always available	21	16.9	76	61.3	10	8.1	10	8.1	7	5.6	2.28

Findings show that the respondents agreed that water projects are regularly inspected (m=4.06), and the water projects are reliable (m=4.00). Respondents disagreed that the water quantity is satisfactorily (m=2.44), clean and safe drinking water is always available (m=2.28), and funds generated from the projects cater for operation and maintenance (m=2.00). Findings imply that the water projects have sustainable challenges. The funds generated do not adequately meet the O&M needs of the projects. This could mean that the projects may no longer be helpful to the beneficiaries especially when they break down and not finances for maintenance. The water quantity is not satisfactory which implies that the beneficiaries spend a lot of time at the water points which is a great source of dissatisfaction with the projects. The project managers however make efforts to regular inspect the water projects.

Correlation Analysis

Correlation portrays the strength of relationship between the independent and dependent variable. Table 4 shows the Pearson correlation results.

Table 4: Coefficient of Correlation

Variables		Sustainability	Replication strategy	Pioneering strategy
Sustainability	Pearson Correlation	1		
	Sig. (2-tailed)			
Replication strategy	Pearson Correlation	.497**	1	
	Sig. (2-tailed)	.000		
Pioneering strategy	Pearson Correlation	.574**	.317**	1
	Sig. (2-tailed)	.000	.000	

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

Findings show that; a moderate significant relationship between replication strategy and project sustainability (r=0.497, p=0.000), a strong significant relationship between pioneering strategy and project sustainability (r=0.574, p=0.000). Findings are in agreement with Kanyi and James (2023) that there is a positive and significant influence of capacity building on project success, Khatatbeh (2016) a statistically significant impact of technology on project management and design of constructions

Regression Analysis

Regression analysis was conducted to understand how a unit change in the independent variable (replication strategy, pioneering strategy) may cause a change in the dependent variable (project sustainability). 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	0.890	0.778	0.793	.708

Predicators: (constant) replication strategy, pioneering strategy.

Findings in Table 5 show an adjusted R-square value of 0.778. This shows that 77.8% of changes in project sustainability may be explained by exploration strategy, replication strategy, pioneering strategy, and adaptation strategy. This means that other project integration strategies that this study did not focus on contribute to 22.2% of project sustainability.

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	140.768	4	36.590	70.637	.000[b]
	Residual	40.069	119	.518		
	Total	180.837	123			

Predicators: (constant) replication strategy, pioneering strategy.
Dependent variable: Project sustainability

The ANOVA shows that the F value of 70.637 is significant at the 0.05 significance level. In general, the regression model with the four independent variables of project integration strategies was suitable in explaining the changes in project sustainability.

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	5.618	.521		12.726	.000
Replication strategy	.723	.268	.728	10.827	.000
Pioneering strategy	.589	.180	.518	7.614	.000

As per the SPSS generated in Table 7,

Project sustainability = $2.976 + 0.730\ X_1 + 0.315\ X_2$

According to the results, holding all other project integration strategies at constant zero, sustainability of water projects would be at 5.618. In addition, a change in replication strategy change would cause a change in sustainability of water projects by a factor of 0.723, a change in pioneering strategy change would cause a change in sustainability of water projects by a factor of 0.589.

The magnitude of the t-statistic indicates the strength of evidence against the null hypothesis (typically, that the coefficient is zero, meaning no effect). A higher absolute value of the t-statistic suggests stronger evidence. The sign indicates the direction of the relationship. Results show that replication strategy (t=10.827) had the strongest effect on project sustainability, followed by pioneering strategy (t=7.614).

Therefore, there is a significant relation between replication strategy, pioneering strategy and project performance since the significance level is <0.05 and the test statistic (t) is greater than 1.96.

Conclusion

Project replication strategy involves benchmarking from other successful projects. This helps the project implementers to learn the factors to put in place to enhance project sustainability. Technical ability of operators of water projects is enhanced through of project staff and project implementers though not regular. The project senior staff hire competent project members who are skilled and experienced in management of water projects particularly in arid areas where is need or water projects as a result of rainfall.

Pioneering strategy involves trying out new modes of project implementation. In the case of water projects pioneering involves effective use of technology to ensure that the water is safe for drinking. This is through reverse osmosis. Automating the operations of water boreholes is also another pioneering strategy used in the water projects though only a few projects are automated.

Recommendations

The project financiers should organize trainings and benchmarking for the water project operators. This will enable them to effectively use technology in operations and also when vending water. Training will also equip the operators with basic skills on maintenance of the water projects which will ensure continuous operations. The project managers should communicate effectively with stakeholders. They should be informed about project progress at every phase. The project managers should also share information regarding project sustainability after every project review.

The project should also be trained regularly to upgrade their skills especially on maintenance of the water projects. All the project staff should possess requisite technical capacity in water projects maintenance so as to improve sustainability of water projects. Project managers should perform and schedule realistic project duration using detailed work break down structure and by using various modern software's like MS project and primavera which will help in making detail and well organized project schedule to avoid exaggerated time and cost deviation. They should also give a brief explanation of the design document with the respective professional appointed by the client. And giving awareness about the consequence of design change in the construction phase. They should also integrate technology in the management of water projects.

Areas for Further Study

The researcher recommends the following:

A study focusing on another county in Kenya to ascertain if findings will differ or are similar to sustainability of other water projects in Nairobi County. The studies could be conducted in semi-arid and arid areas where there is acute water shortage to establish whether project integration strategies may affect sustainability of water projects in ASALs

A study on other projects other projects in Nairobi County to establish if project integration strategies affect sustainability of other projects implemented by County government of Nairobi. These projects may include health, education, or infrastructural projects

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