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## **Implementation Process of Project Control Systems, Project Team Training Diversity and Performance of Rural Roads Construction Projects in Kenya**

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### **Abstract:**

*Performance of construction projects has not been consistency. Factors causing the poor performances have not been clearly ascertained. This sector being the biggest beneficiary of funding, requires to establish the factors that hinder its performance. Rural roads being the drivers of economic prowess of the majority of the population in the developing countries requires an in-depth understanding from the basis of diversity of the workforce in those projects. Therefore the purpose of this paper was to investigate the extent to which project team training diversity influence the relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya. It adopted cross-sectional correlational survey design where structured questionnaires, interview guide and focussed group discussion were used in obtaining data from workers in rural roads construction projects. Both descriptive and inferential methods of data analysis were used. With  $r = 0.533$ ,  $R^2 = 0.284$  and  $F(1,195) = 77.208$  at  $p = 0.000 < 0.05$ , the null hypothesis was rejected and concluded that there is a significant relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya. With  $r = 0.804$ ,  $R^2 = 0.647$  and  $F(1,195) = 356.874$  at  $p = 0.000 < 0.05$ , the null hypothesis was rejected and concluded that there is a significant relationship between project team training diversity and performance of rural roads construction projects in Kenya. With  $r = 0.830$ ,  $R^2 = 0.690$ ,  $F(1,193) = 142.975$  at  $p = 0.144 > 0.05$ , null hypothesis was therefore failed to be rejected and it was therefore concluded that the significant relationship between implementation process of project control systems and performance of rural roads construction projects does not depend on project team training diversity. It is therefore recommended for training diversity in job related tasks for the workforce that would increase the transactive memory of the workers in sharing variety of skill among them during construction of projects. Policy on training diversity should be also be clear and adhered to within the organisation.*

**Keywords:** Project team training diversity, Performance, Construction projects

### **1. Introduction**

Most prejudgments of persons in a project team are deeply rooted in their way of doing work based on the trainings they have obtained. Sources of trainings such as teachers and books influence on individuals' opinions in what to say is right and what is wrong. These trainings from colleges are deeply engrained within individuals and shape their views about how they construe things and react to them. What is learnt and experienced gives a subjective point of view during performance of tasks at workplaces. Such group of individuals with diverse training background requires an environment that is accommodating, supportive where all are free to seek help, participate in problem solving and decision making processes, and create a team spirit where everyone feels part of the organisation they are working for.

A number of studies that have been carried out on training alone as variable indicate varied results on their influence on performance. Barrett and O'Connell (1998) found that specific training had an influence on wages and productivity than general training while Mason et al. (1996) found out that both value added and product quality were higher where workers were trained to take charge of several production lines at once. Cosh et al. (2003) found out that training had a strong and significant effect on employment growth in

small firms when it was undertaken regularly rather than on an ad hoc basis. They further argue that for some firms there was an association between intensity of training and profitability. It was therefore important to investigate how diversity in training among the workers would influence on performance of rural roads construction projects in Kenya.

## 2. Problem Statement

In a construction project more than one professional is involved to deliver a project (Chinyio and Olomolaiye, 2010). These professionals come from different training backgrounds and exposure (Almahmoud and Doloji, 2013). For a road construction such professionals include architects, engineers, quantity surveyors, builders among others. Whatever the mix of construction professionals on different projects, each has own interest, especially in the exercising of their skills and judgement (Abdul-Rahman, Wang and Yap, 2010). The skills obtained differ in a manner in which they were thought in college attended, specialty of the qualification they studied, intensity and frequency of trainings they attend regularly. It is therefore arguable that these professionals differ significantly in delivering the projects based on their training diversity especially on the implementation of project control systems. These differences and how they influence performance of projects is a subject that has been given little attention so far by researchers. Most of the studies in the extant literature have focused on the diversities of the work force in improving on performance of the organisations whereby the views of the senior management have been intensely researched. Very little attention has been paid to the perceptions of non-management workers on their training diversity in their organization. Therefore to fill this gap of knowledge this study was carried out to establish how project team training diversity among the workers influence on the relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya.

## 3. Research Objectives

The research objectives of the study were as follows:

1. To investigate the extent to which implementation process of project control systems influence performance of rural roads construction projects in Kenya.
2. To establish the extent to which project team training diversity influence performance of rural roads construction projects in Kenya.
3. To examine the extent to which project team training diversity influence the relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya.

## 4. Hypotheses

Based on the research questions, the following research hypothesis were formulated:

1. H<sub>1</sub>: There is a significant relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya.
2. H<sub>1</sub>: There is a significant relationship between project team training diversity and performance of rural roads construction projects in Kenya.
3. H<sub>1</sub>: The strength of the relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya depends on the project team training diversity.

## 5. Literature Review

Training is one of the key issues of maintaining performance and eventually minimizes project overruns. Myaskovsky et al., (2005) carried out a study to ascertain the combined impact of gender composition and training method on both the performance and interpersonal behaviours exhibited in small work groups. The groups were trained to assemble the portion of a radio and tested one week after. Unexpectedly Myaskovsky et al., (2005) results indicated that groups whose members were trained together took longer to assemble their radios and made more errors than groups whose members were trained apart. The results emphasize the importance of understanding project team intensity training diversity. They also argue that when workers are trained separately, may rely on stereotypical, inaccurate beliefs to identify each other. They conclude by arguing that a strong and mentoring culture usually practiced by most organizations probably considers the importance of project team training diversity.

The intensity, frequency and nature of training of the project team members to work together as a group rather than a part would probably lead to better implementation process of project control systems in this study and eventually lead to improved performance. This is based on the argument by Myaskovsky et al., (2005) who opined that training project teams together enhances group performance with an aim of developing transactive memory system In roads construction projects, training usually occurs in various trades, institutions, duration, frequency, intensity and type of training. Group training is perceived to be a complimentary approach to the trainees. Myaskovsky et al., (2005) further argues that group training enables each worker to end up not only knowing about him/herself but also learns about what other group members know about the task. By so doing when group members cannot recall certain information themselves, they can turn to each other for information. Myaskovsky et al., (2005) argues that during group training, relationships are developed and that personalized relationships would create perceived high quality relationships and hence influence employee performance. This is supported by Graen et al (2004). In the current study, the intensity of training, frequency of training, nature of training, qualifications obtained, the colleges attended and the period of training was studied with an aim of establishing their influence on the relationship between implementation of project control system and performance of rural roads construction projects in Kenya.

Extra qualification diversity requirements of other skills for project engineers are mostly considered in the construction industries during recruitment. In the field of construction Walesh (2000) carried out a study by examining the education needs of civil engineers and he reported that engineering oriented employers are now seeking workers with exceptional people skills in addition to technical competency. Diversified individual skills and qualifications are sought for and this brings about a debate as to why there is a significant interest in examining the impact of the personal characteristics of an individual, such as skill, personality, experience and motivation, on the effectiveness of individuals in job performance (Dulaimi, 2005). In examining these factors, (Dulaimi, 2005) further adds that workers' behaviour depends on factors such as age, gender, and educational level. Silverstein (2008) contributes to this debate by arguing that limitations of age and education can be compensated, through practice, training and experience. Notably, these were the same project team training diversity factors considered in this study albeit based on rural roads construction context during the implementation process of project control systems.

Training the project team together enhances performance since the group would identify the ability of each member during training. In another study, Myaskovsky et al (2005) sought to study on the effects of gender diversity on performance and interpersonal behaviour in small work groups. The participants were 288 students recruited from introductory psychology classes at the University of Pittsburgh to assess them on training. The students were randomly assigned to 96 three-person groups of varying gender compositions (all men, all women, one woman and two men, or one man and two women), which were then assigned to either individual or group training conditions. With negligible exceptions, all group members were white and ranged in age from 18 to 25. They were then trained and tested individually and in groups on how to assemble a radio. Myaskovsky et al (2005) found out that mixed gender and same gender groups performed equally well on their assigned task. Furthermore, there was no performance advantage conferred by group as opposed to individual training in either the mixed-gender or the same-gender groups. This was in contrast to other studies that group training improves transactive memory system (Moreland and Myaskovsky, 2000). In performing a complex task like implementing project control systems, it requires a link between training and the development of transactive memory systems in work group performing in those complex tasks. He argued that transactive memory exists when people in close relationship use other people as memory storage locations in the sense that when training as a group one is able to understand the capability of each members and hence sought assistance when stuck in the implementation process of the project control systems. The study by Myaskovsky et al (2005) concludes that gender diversity tends to affect behaviour, communication, and individual experience within groups, rather than group performance per se. However the current study sought to identify whether training diversity had an influence on the relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya.

Scholars have drummed support for education, training and experience as the three sources from which project managers can develop their knowledge and skills. Dulaimi (2005), in his study on influence of academic education and formal training on Project Managers' behaviour. The results indicated that for an academic and professional development programmes to provide the right balance (in content and emphasize), technical knowledge and the people management skills should be mandatory for young professionals (Dulaimi, 2005). The current study therefore endeavoured to establish how project team training diversity would influence on the relationship between the implementation process of project control systems and performance of rural roads construction projects.

Training should be geared towards obtaining a specific skill which can be defined. In this aspect training would be taken as practical and job oriented and is in terms of methods and procedures. The current study would argue that once there is a mismatch between the project team diversities, the leaders should be trained so as to improve the leadership and get situational controls especially in implementation process of project control systems. Dulaimi (2005) is of the same opinion by arguing that training is a source of motivation of construction workers and also it improves the individual's performance thus a doubles up performance. The current study was based on these arguments however in the context of implementation process of project control systems and performance of rural roads construction projects in Kenya.

## 6. Conceptual Framework

The conceptual framework depicts the relationships of variables that were under study. The independent variable was implementation process of project control systems and the dependent variable was the performance of rural roads construction projects. This relationship was subjected to project team training diversity as a moderating variable. Figure 1 illustrates the relationship.

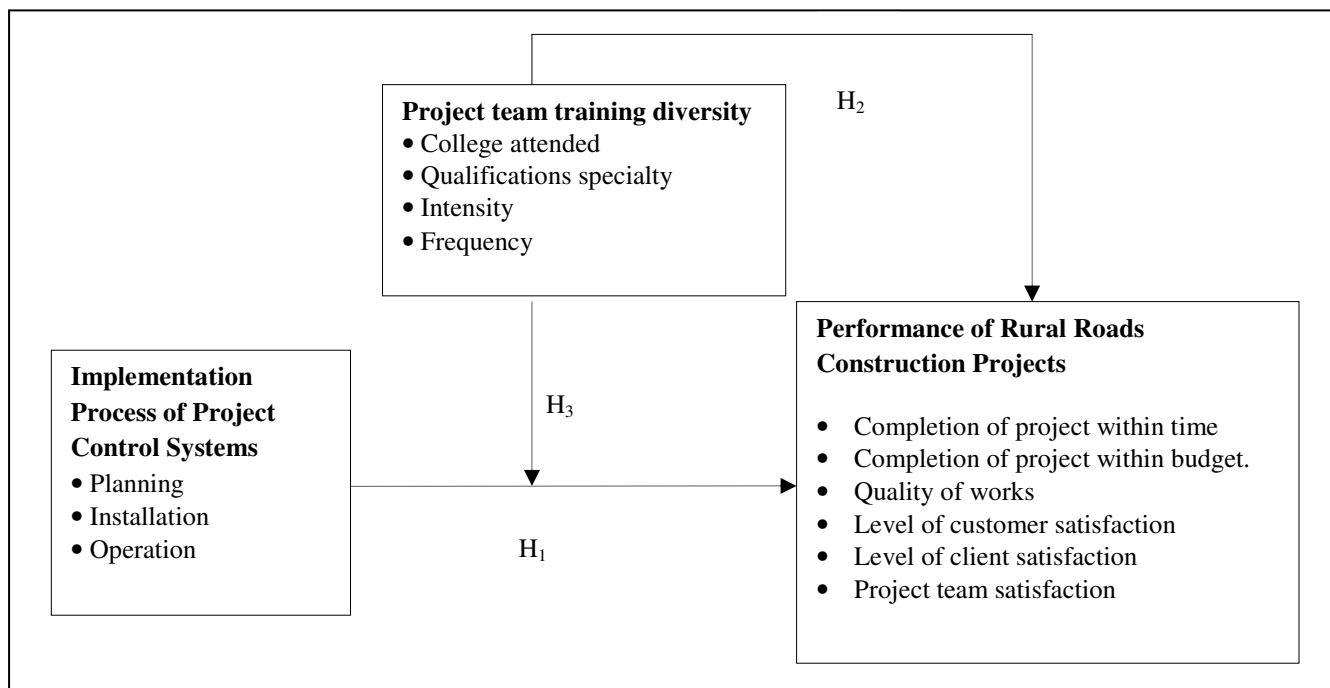


Figure 1: Conceptual framework

## 7. Methodology

The study sought to establish the moderating influence of project team training diversity on the relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya. Thorough literature review was carried out and based on the outcome, a questionnaire was constructed with an aim of measuring training diversity indicators and performance of rural roads construction projects. In this study mixed mode approach was used whereby both quantitative and qualitative data was collected. Questionnaire, in-depth interviews and focused group discussions were used for collecting the data. Each interview lasted on average of 20-25 minutes and the focused group discussion lasted averagely 45-50 minutes. The targeted population was 3680 workers of Kenya Rural Roads Authority funded projects. A total of 361 questionnaires were distributed and 209 were completed and returned. This represented a response rate of 58%. Questionnaires were administered by the research assistants. This allowed for contact with the respondents, some of whom due to illiteracy levels would not be able to read and fill the questionnaire. Pilot test was conducted on two roads project in Kiambu County and the data was analysed using Statistical Package for Social Science (SPSS) software version 23. There Cronbach alpha coefficient was 0.652 based on ten items which was desirable since 0.6 is the bare minimum acceptable (Sekaran, 2003, Hair et al, 2006). It was therefore concluded that the internal consistent reliability measures used were good and to have adequately measured the study's variables and were therefore considered for further analysis

## 8. Results and Discussion

Research objective one was to investigate the extent to which project team training diversity influence performance of rural roads construction projects in Kenya. In this case, project team training diversity was measured in terms of similarities or dissimilarities in colleges attended, qualification specialities, intensity of training and frequency of the training. Data was therefore collected and analysed.

### 8.1. Demographic Profiles of Respondents

The demographic profiles in terms of gender, age group, highest level of education, period worked in the construction industry and position held in the company were collected and the results were as tabulated in Table 1.

Demographic Profile	Frequency	Percentage %	Cumulative Percentage %
<b>Gender</b>			
Male	188	95.4	95.4
Female	9	4.6	100.0
Total	197	100	
<b>Age Group</b>			
18-25	25	12.7	12.7
26-30	41	20.8	33.5
31-35	37	18.8	52.3
36-40	26	13.2	65.5
41-45	18	9.1	74.6
46-50	10	5.1	79.7
51-55	18	9.1	88.8
Over 55	22	11.2	100.0
Total	197	100	
<b>Highest Level of Education</b>			
Undergraduate degree	2	1	1
Diploma	25	12.7	13.7
Post-Secondary Certificate	38	19.3	33.0
Other	132	67	100.0
Total	197	100	
<b>Period Worked in Construction Industry</b>			
Less than 1 year	29	14.7	14.7
1-5 years	51	25.9	40.6
6-10 years	49	24.9	65.5
11-15 years	24	12.2	77.7
16-20 years	11	5.6	83.3
Over 20 years	33	16.7	100
Total	197	100.0	
<b>Position Held in the Company</b>			
Senior management	2	1.0	1.0
Middle management	19	9.6	9.6
Lower management	29	14.7	14.7
None managerial staff	147	74.0	33.0
Total	197	100.0	100.0

Table 1: Demographic profile of the respondents

Results from the table reveals that 95.4% of the respondents were male while 4.6% were female. The data therefore reveals that one gender dominates the construction industry. This confirms the general believe that construction industry in menial and a preserve of men. The distribution of respondents of age group between 18-25 years was 12.7%, and those between 26-30 years were 20.8%, while those between 41-45 years were 9.1%. The results also indicates that majority of the respondents were of age between 26-30 years which is the prime age group for youths seeking employment. In terms of education 1% of the respondents were holding an undergraduate degree while 67% had a form four education and below. This implied that majority of the construction workers did not have any formal education in the respective areas of their work especially higher education. Most of them (67%) had been educated through apprenticeship. Further the results revealed that those who had worked for less than 1 year were 14.7% and those worked between 1-5 years were 25.9%, and those above 20 years were 16.7%. The result implied that the majority of the respondents (85.3%) had worked in the construction industry for more than 1 year. The results further revealed that 1% of the respondents were senior management, while 9.6% were middle management, 14.7% were lower management while 74.0% were non managerial staff. These results reveals that majority of the respondents were non-management staff at 74% and were enthusiastic in participating in the survey.

#### 8.2. Descriptive Analysis on Project Team Training Diversity

Descriptive analysis was carried out to establish the extent to which workers of the construction companies perceived themselves differently from others in their places of work in terms of the trainings attained. Project team training diversity was measured using ten items based on 5 point Likert scale ranging from 1 = strongly agree to 5 = strongly disagree. The results were as tabulated in Table 2.

NO	Item	N	Min	Max	Mean	Std Deviation
T1	In our department, I feel that the training I attended is different from what others did	197	1.00	5.00	2.97	1.754
T2	I have attended work related trainings several times than other project team members	197	1.00	5.00	3.29	1.691
T3	In my department, my qualification is different from other members	197	1.00	5.00	2.62	1.667
T4	In terms of the college/school I attended, I think I am different from other project team members	197	1.00	5.00	3.51	1.746
T5	In my team, members always take instructions from people who have higher qualifications in training before starting to work.	197	1.00	5.00	1.43	1.026
T6	In my team, some members are more trained than others	197	1.00	5.00	1.66	1.289
T7	Some team members even if trained, lack certain skills and knowledge that are relevant to their work	197	1.00	5.00	1.72	1.211
T8	If I had my way, I would want to improve on my training	197	1.00	5.00	1.25	.913
T9	The qualification of the new members joining the company is as good as those who trained long time ago	197	1.00	5.00	2.45	1.715
T10	I don't have enough training to perform tasks with the latest technologies	197	1.00	5.00	2.58	1.755
Composite mean = 2.348 Composite standard deviation = 1.4767 Cronbach alpha coefficient = 0.652						

*Table 2: Means and Standard Deviation for Measures of Project Team Training Diversity*

Results in Table 2 indicate that item T1 sought to establish whether the training the respondent's attended was different from other project team members. The mean score was 2.97 while the standard deviation was 1.754. This result indicates that the majority of the respondents agreed that the training they attended was different from what other project team members did. However majority disagreed that they had attended work related trainings several times than other project team members. Undeniably the majority of the respondents agreed that in their department, they perceived their qualification as different from other members but disagreed that in terms of the colleges/schools they attended, that they were different from other project team members.

Further investigations revealed that majority of the respondents agreed that in their places of work, team members always took instructions from people who have higher qualifications in training before starting their daily to work and majority of the respondents also agreed that in their work places, some members were more trained than others.

The result also indicates that the majority of the respondents agreed that some team members even if trained lacked certain skills and knowledge that were relevant to their work. This necessitates them to eagerly want to improve on their training.

On seeking to establish whether the qualification of the new members joining the company was as good as those who trained long time ago, the majority of the respondents agreed to that connotation and also accepted that they didn't have enough training to perform tasks with the latest technologies.

The composite mean was 2.348 while the composite standard deviation was 1.4767. The Cronbach Alpha coefficient of the 10 item statements was 0.652 indicating existence of moderate internal consistencies of the items that were used for measuring this variable.

This implied that majority of the workers in rural roads construction companies did not cogitate themselves differently in their places of work based on their diversities of trainings in terms of colleges attended, qualification specialities, intensity and frequency of the training. This heightened interactions in their places of work and boosted performance of rural roads construction projects.

### 8.3. Inferential Statistics

Further analysis was carried out to establish the magnitude and the direction of the influence of project team raining diversity on the relationship between implementation process of project control systems and performance of rural roads construction project.

#### 8.3.1. Inferential Analysis on Implementation Process of Project Control Systems on Performance of Rural Roads Construction Projects

In testing hypothesis one, data was collected from the respondents who were asked to rate the extent to which items I1 to I11 composed of statements on implementation process of project control systems and how they were applicable in their organisation on a Likert type scale of 1= strongly agree to a scale of 5 = strongly disagree. Likewise data was collected from the respondents by asking them to rate itemized statement P1 to P13 on a Likert scale where 1= strongly agree to a scale of 5 = strongly disagree in measuring performance of rural roads construction projects. Objective one was therefore tested using the hypothesis and simple linear correlation model as shown:

- Hypothesis 1

→  $H_0$ : There is no significant relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya.

→  $H_1$ : There is a significant relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya.

➤ Correlation Model

The mathematical model used for testing this hypothesis was as follows:

Performance of rural roads construction projects = f (Implementation of project controls systems)

$$Y = f(X_1)$$

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where

$X_1$  = Implementation Process of project control systems

$\beta_0$  = Constant term

$\beta_1$  = Beta coefficients

$\varepsilon$  = Error term

The correlation results for the influence of implementation process of project control systems on performance of rural roads construction projects in Kenya are presented in Table 3.

		Unstandardized coefficients		Standardized coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.048	.118		8.847	.000
	Implementation process of PCS	.361	.041	.533	8.787	.000
Predictors: (constant), Implementation process of project control systems						
Dependent Variable: Performance of Rural Roads Construction Projects						
F (1,195) = 77.208 at level of significance $p=0.000<0.05$ , $r=0.533$ , $R^2 = 0.284$						

Table 3: Correlation Results for the Influence of Implementation Process of Project Control Systems on Performance of Rural Roads Construction Projects

From regression results in Table 3, they indicate that when implementation process of project control systems and performance of rural roads construction projects are applied in the model,  $R^2 = 0.284$ ,  $p < 0.05$ . This therefore means that implementation process of project control systems is associated with 28.4% of the variability in performance of rural roads construction projects. The resultant regression model was;

$$Y = 1.048 + 0.533X_2$$

Basing on the model, Beta values were  $\beta = 0.533$ ,  $t = 8.787$ ,  $p < 0.05$  indicated that for every unit increase in implementation process of project control systems, resulted into 53.3% increase in performance of rural roads construction projects. In general the model was significant at  $F = 77.208$  and  $p < 0.05$ .

### 8.3.2. Inferential Analysis on Influence of Project Team Training Diversity on Performance of Rural Roads Construction Projects

Project Team Training Diversity was regressed on Performance of Rural Roads Construction Projects in order to address objective two which was to investigate the extent to which project team training diversity influence performance of rural roads construction projects in Kenya. Performance of the rural roads construction projects was measured in terms of completion within time, completion within quality, completion within schedule, client satisfaction, customer satisfaction and workers satisfaction. Data was collected from the respondents by asking them to rate 13 itemized statements on performance of rural roads construction projects on a Likert scale where 1= strongly agree to a scale of 5 = strongly disagree. Objective two was therefore tested using the hypothesis and a simple linear correlation model as shown:

- Hypothesis 2

→  $H_0$ : There is no significant relationship between project team training diversity and performance of rural roads construction projects in Kenya.

→  $H_1$ : There is a significant relationship between project team training diversity and performance of rural roads construction projects in Kenya.

➤ Correlation Model

The mathematical model used for testing this hypothesis was as follows:

Performance of rural roads construction projects = f (Project team training diversity)

$$Y = f(X_3)$$

$$Y = \beta_0 + \beta_3 X_3 + \varepsilon$$

Where

$X_3$  = Project team training diversity

$\beta_0$  = Constant term

$\beta_3$  = Beta coefficients

$\varepsilon$  = Error term

The correlation results for the influence of project team training diversity on performance of rural roads construction projects in Kenya were presented in Table 4.

		Unstandardized coefficients		Standardized coefficients		
Model		B	Std Error	Beta	t	Sig.
1	(Constant)	.063	.107		.585	.559
	Project Team Training Diversity	.690	.037	.804	18.891	.000
Predictors: (constant), Project Team Training Diversity						
Dependent Variable: Performance of Rural Roads Construction Projects						
F (1,195) = 356.874 at level of significance $p=0.000<0.05$ , $r= 0.804$ , $R^2 = 0.647$						

Table 4: Correlation Results for the Influence of Project Team Training Diversity on Performance of Rural Roads Construction Projects

Results from table 4 indicate that the Pearson's Product Moment Correlation coefficient ( $r$ ) was 0.804. It would therefore be argued that the correlation between the variables under study (project team training diversity ( $X_3$ ) and performance of rural roads construction projects ( $Y$ )) was significant.  $R^2$  was 0.647 meaning that the influence of project team training diversity explains 64.7% of the variation in performance of rural roads construction projects in Kenya. The null hypothesis was therefore rejected and it was concluded that there was a significant relationship between project team training diversity and performance of rural roads construction projects in Kenya.

After substituting the beta and constant values in the model, the equation was as follows:

$$Y = 0.063 + 0.804X_3$$

The model indicates that a unit % increase in project team training diversity ( $X_3$ ) would result to 80.4% increase in performance of rural roads construction projects ( $Y$ ). Therefore, project team training diversity significantly influences the performance of rural roads construction projects. This analytical result implies that project team training diversity significantly influences performance of rural roads projects.

This was also confirmed by the respondents interviewed and from the focus group discussions carried out who argued that in the initial stages of employment, project team members usually associate with those from either the same college attended during training, or the qualification speciality or those who had attended the same training (intensity and frequency). This hampers performance at the beginning however over a period of time and after more interactions among the team members, this situation drastically reduces and eventually team members start interacting and associating freely although it was not guaranteed to completely eradicate those associations. They further indicated that the varied intensity and frequency of training on project team members, especially for new equipment and technologies increased the performance of construction projects through sharing of experiences especially on challenging encounters.

#### 8.3.4. Inferential Analysis on Project Team Training Diversity on the Relationship between Implementation Process of Project Control Systems and Performance of Rural Roads Construction Projects

Objective three of the study also sought to establish the influence of project team training diversity on the relationship between implementation process of project control systems and performance of rural roads construction projects. To carry out inferential analysis for research objective three the following hypothesis and a regression model were used:

- Hypothesis 3

→  $H_0$ : The significant relationship between implementation process of project control systems and performance of rural roads project does not depend on project team training diversity.

→  $H_1$ : The significant relationship between implementation process of project control systems and performance of rural roads project depends on project team training diversity

- Regression Model

The mathematical model used for testing this hypothesis was as follows:

Performance of rural roads construction projects =  $f$  (Implementation process of PCSs (Project team training diversity))

$$Y = f(X_1 (X_3))$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_3 X_3 + \beta_{13} X_1 X_3 + \varepsilon$$

Where

$X_1$	=	Implementation process of PCSs
$X_3$	=	Project team training diversity
$\beta_0$	=	Constant term
$\beta_1, \beta_3, \beta_{13}$	=	Beta coefficients
$\varepsilon$	=	Error term



The analysis to identify the direction and magnitude to which the interaction term between project team training diversity and implementation process of project control systems influences performance of rural roads construction projects was carried out and the results indicated in Table 5.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.509	.441		1.155	.250
Implementation of PCS	-.073	.155	-.108	-.471	.638
Project Team Training Diversity	.389	.153	.453	2.540	.012
Implementation of PCS* Project Team Training Diversity	.076	.052	.500	1.466	.144
Predictors: (Constant), Implementation Of PCS, Project Team Training Diversity, Interaction Implementation of PCS*Project Team Training Diversity					
Dependent Variable: Performance of rural roads construction projects					
F (1,193) = 142.975 at level of significance $p=0.144>0.05$ , $r=0.830$ , $R^2=0.690$					

Table 5: Regression Results for the Influence of Project Team Training Diversity on Relationship between Implementation Process of PCS and Performance of Rural Roads Construction Projects

Table 5 indicates the results after the interaction term between project team training diversity factors and implementation process of PCS was introduced in the model,  $R^2$  change increased by 0.003 from 0.686 to 0.690. The change indicating a statistically insignificant values at  $p=0.144>0.05$ . This was between the variables implementation process of PCS ( $X_1$ ), project team training diversity ( $X_3$ ) and the interaction ( $X_1X_3$ ). When the interaction term was added into the equation, Beta values were  $\beta=0.500$ ,  $t=1.466$ ,  $p=0.144>0.05$  meaning it was 85.6% confidence which was less than the minimum threshold of 95% hence statistically insignificant. Based on these findings, the interaction of project team training diversity and implementation process of project control systems did not significantly influence performance of rural roads construction projects. The null hypothesis was therefore failed to be rejected and it was concluded that the significant relationship between implementation process of project control systems and performance of rural roads construction projects does not depend on project team training diversity.

## 9. Discussion

Objective one of this study was to investigate the extent to which project team training diversity influence performance of rural roads construction projects in Kenya. To address this objective, a null hypothesis was formulated and tested that there was no significant relationship between project team training diversity and performance of rural roads construction projects in Kenya. The hypothesis was rejected and concluded that there was significant relationship between project team training diversity and performance of rural roads construction projects in Kenya.

These study findings obtained supported the study by Myaskovsky et al., (2005) who alluded that performance would be sustained when group trainings were conducted. The practice of group training was identified as a common practice in construction companies. Out of the interviews and focused group discussions, findings indicated that group trainings was practiced because 'two hands are better than one'. Some respondents also said that by so doing workers supported each other in cases of absence of the worker. This also supported the transactive memory theory whereby group training provides a contemporary approach to trainees which created relationships that were personalized and hence influenced employee performance.

Finding obtained from in depth interviews and focus group discussions indicated that there was no preference of graduates or trainees from any institution. Equal opportunities of recruitment were given to all those seeking employment. Surprisingly, majority of the employees had no formal education or training, however many of the employees had O-level education and below. This study however established that most companies preferred training their workers through apprenticeship. By so doing apprenticeship developed spirit de corps among the workers. On few cases of acquiring new equipment and technology, it was unanimous with all companies that special training was organised by the suppliers who would train trainer of trainer. The correlation ( $r$ ) between project team training diversity and performance of rural roads construction projects was at 0.804 indicating a very strong relationship.

Objective two in this study was to examine the extent to which project team training diversity influence the relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya. The null hypothesis was failed to be rejected and therefore concluded that the strength of the relationship between implementation process of project control systems and performance of rural roads construction projects in Kenya does not depends on the project team training diversity. This study findings differed with Doloi (2008) study that found out that the productivity of construction workers is one of the causes of schedule slippages. He established that, it was important for project managers to monitor workers' productivity, and improve it through training, close supervision and motivation in order to achieve good time performance. However the findings from interviews and focus group discussions did concur with these findings. The interviewees observed that most of the workers do not have special training but they have undergone apprenticeship orientations over a period of time until they were able to perform tasks as required. Formal training were dismally carried out in most companies hence there was limited training diversity among the recruited members.

Objective three of the study also sought to establish the influence of project team training diversity on the relationship between implementation process of project control systems and performance of rural roads construction projects. The hypothesis was failed to be rejected and it was therefore concluded that the significant relationship between implementation process of project control systems and performance of rural roads construction projects does not depend on project team training diversity. Probably this was due to the fact that once the workers had worked as a team for some time, they developed the transactive memory system that would encourage the workers to work intimately without necessarily following the requirements of the slow and bureaucratic project control systems.

### 10. Conclusion

Research objective one was to establish the extent to which project team training diversity influence performance of rural roads construction projects in Kenya. Indicators for project team training diversity were colleges attended, qualification speciality, intensity of training and frequency of training and were based on literature review and were included in the research instrument. Descriptive statistics showed that majority of the respondents felt that they needed to improve on their training. It can therefore be concluded that majority of the workers in the construction companies felt that training either formal or informal, influenced their performance. The results from inferential statistics indicated that project team training diversity had a strong positive influence on performance of rural roads construction projects. With  $r = 0.804$ ,  $R^2 = 0.647$ ,  $p < 0.05$ , it was therefore concluded that there was a positive influence of project team training diversity on performance of rural roads construction projects in Kenya. However with  $F(1,193) = 142.975$ ,  $p = 0.144 > 0.05$ ,  $r = 0.830$ ,  $R^2 = 0.690$  it was conclude that that the significant relationship between implementation process of project control systems and performance of rural roads construction projects does not depend on project team training diversity. This implied that rural roads contractors should practice employing diverse workforce in terms of colleges attended, intensity of training, qualification speciality, and frequency of training in their workforce since it would directly and positively influence on performance of rural roads construction projects.

### 11. Recommendations

This paper recommends that employers to employ diversely trained team. This will increase the transactive memory systems especially in information sharing. Employers need to increase the volume and quantity of training so as raise job satisfaction of the workforce hence creating a pool of knowledge resource to tap from. These training would have to target a larger proportion of workforce for it to have an influence on performance. Further the skills gained must be utilised to influence on performance of rural roads construction project.

It is again recommended that the organisation training policy should have support of senior management commitment and accountability. Leadership in leveraging project team training diversity should be held high by the line managers. The organisation training strategy should seem to be inclusive and fair among the workers. Further it is recommended that group trainings or recruiting individuals with different skills in terms variety of colleges attended, variety of qualification specialties, variety of intensity and frequency of trainings be emphasized. By so doing the variety of skills and perspectives among the workers would strength the team by capitalizing on the strengths from the individual members.

### 12. Future Studies

This study considered project team training diversity and how it influence the relationship between implementation process of project control systems and performance of rural roads construction projects. A study on how the training intensity and frequency affects individual satisfaction and job performance at workplace is recommended.

This study was based on data collected from the workers who were non-management hence an element of biasness. Future studies should focus in triangulating with multiple sources of data by including line managers or engineers and also from other stakeholders like the government ministries, communities, consultants and sponsors.

This study being across-sectional study was carried out at one point in time. A longitudinal study is hereby recommended to establish how the relationship between project team training diversity and performance of rural roads projects would take shape over a period of time among the employees. This would confirm if the correlation relationships are stable or they change over time and even unearth important conclusions.

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