Policy Interpretation, Project Management Practices and Performance of Construction Projects

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PERFORMANCE OF CONSTRUCTION PROJECTS - THE INFLUENCE OF POLICY INTERPRETATION AND MEDIATION OF PROJECT MANAGEMENT PRACTICES

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ABSTRACT

The study sought to determine whether the performance of construction projects was influenced by school infrastructure policy interpretation and whether project management practices mediated that relationship. A cross-sectional survey using a correlational design was used. The target population comprised of 920 headteachers and 82 District Education Officers (DEOs) in all the 13 regions of Somaliland. Purposive sampling and proportionate stratified random sampling with replacement were used to sample 257 headteachers while simple random sampling was used to sample 20 DEOs. Data collection was by self-administered questionnaires for headteachers and semi-structured interviews for DEOs. Questionnaires pilot testing was done on 28 headteachers. Variable relationships were tested using t-tests at 5% level of significance. School infrastructure policy interpretation exerted a significant direct effect (b = -0.3215, p< 0.001, R^2 = 0.4183) on the performance of construction projects. Project management practices mediated the relationship with a significant positive indirect effect of 0.4548, CI [0.3505, 0.5642]. A direct negative linear relationship existed between school infrastructure policy interpretation and the performance of construction projects. Policy interpretation exerts its influence on the performance of construction projects through project management practices.

Keywords: Policy interpretation, project performance, mediation, construction projects, school infrastructure policy.

1. INTRODUCTION

The importance placed in education globally can be seen in its inclusion in global goals such as sustainable development goals and in government investments and budgetary allocations to education ministries and departments worldwide. Many governments use the school system to deliver education services to their citizens. This requires establishing school infrastructure which in turn requires undertaking school infrastructure construction projects. School construction projects take the form of establishing new infrastructure facilities, expanding existing facilities, maintenance repair or rehabilitating of old facilities. The success of such projects can be measured using indicators such as timely completion, completion within budget, client satisfaction, meeting scope and quality standards among others. Different authors have advocated different project performance indicators among them: Freeman and Beale (1992), Shenhar, Levy, and Dvir (1997); Lim and Mohammed (1999), Sadeh, Dvir, and Shenhar (2000),Vandevelde, Dierdonck and Debackere (2002), Chan, Scott and Lam (2002), Shenhar, Tishler, Dvir, Lipovetsky and Lechler (2002) and, Patanakul and Milosevic (2009). These performance indicators gravitate around; project budget management, schedule management, the realization of project objectives, meeting standards, and client and stakeholder satisfaction. This study adopted the Chan and Chan (2004) blend of objective and subjective indicators: realization of project deliverables, variations from project plans and set standards, attaining project functionality, and satisfaction of the client, contractor, end-users, design team and construction teams with the project outcome.

To ensure the quality of school facilities, governments establish school infrastructure policy to set process, output and other standards for school infrastructure. The policy makes various provision and requirements for schools to adhere to when establishing school infrastructure and when undertaking school infrastructure construction projects. Interpreting the policy entails interpreting the policy substance requirements and the resource requirements necessary to successfully implement the policy. These interpretations should be done carefully so as not to constrain or extend the policy provisions and the spirit of the policy (Coglianese, 2012). In the case of school infrastructure policy, the following policy substance needs to be interpreted: the provisions of the policy, infrastructure projects covered in the policy, quality standards set, stipulated project financing activities, stakeholder and partnerships engagements, development planning, and school management obligations for school construction projects (Brown, Stern, Tenenbaum and Gencer (2006). Even when the schools are using the same school infrastructure policy, policy interpretations tend to vary among the implementers. This can be attributed to: varied policy exposure, differences in education levels and training specializations of implementing managers, the individual effort made to understand the policy by managers, personal interest in the policy, variations in school management experience working with the policy, access to the policy, policy substance language and vocabulary and, policy substance clarity or ambiguity among others. Policies can be given as one document or as provisions and mentions in a different policy and regulatory documents (Coglianese, 2012). When the policy substance is scattered over different policy documents, policy users may not have access to all the documents and may be unaware of the full extent of the policy. This can increase policy interpretation variations even more. Policy interpretation can be indicated by users' and implementers' access of the policy, existence and use of policy interpretation guidelines, policy users' education and sensitization on the policy, the existence of policy disputes and litigations, existence of significant policy ambiguity, uncertainty in the policy substance, policy existence form, and extent of consistency in the determination of resource requirements for policy implementation by the users.

Project management practices unfold around the project cycle and are key in determining the project's performance. The relationship between project focused policies and project management practices are two-way. When project regulatory policies are set, they influence and even change project management practices that project managers deploy. In the reverse, the practices that project managers use and deploy can be what causes the need for regulatory policy intervention by the government. When a regulatory policy is enacted, it changes existing practices and existing practices also inform the need for a policy or a policy review. The study sought to assess the influence of school infrastructure policy interpretation on the performance of construction projects in primary schools in Somaliland with project management practices mediating the relationship.

Once a policy is instituted, policy users and implementers interpret the policy substance in terms of what the requirements are and the resources needed to fulfil those requirements (Coglianese, 2012). Depending on the existing situation and current practices in an organization, the resource or cost interpretation of a policy may vary from one organization to organization. Different parties may interpret the same policy differently hence one policy may attract a mixture of support and criticisms. Policy ambiguity refers to provisions in the policy being unclear as to their intended meaning or having more than one interpretations. Where the policy is ambiguous, the results can be detrimental to both policy objectives and organizational objectives. School infrastructure policy substance ambiguity can result to delay of new projects, failure of existing projects, back-passing and jostling between the parties involved, a halt in mounting new school infrastructure projects, slack service delivery, and blame games among the regulators and the policy implementers (Dubois, 2014). Such policy ambiguities can also result in policy uncertainty among the regulated parties and eventually different interpretations of the same policy. When the resource interpretation of the policy is lacking, policy implementation faces many handles and realization of policy goals is frustrated. This has been witnessed in numerous African countries that introduced free primary education policy in line with international millennium goals without interpreting the infrastructural resource requirements necessary to support the free primary education and ensure quality was not compromised. This was the case in Malawi (Kadzamira and Rose, 2001), Kenya (Ngware, Oketch, and Ezeh, 2011), Tanzania (Moshi and Vavrus, 2009) and South Africa (Marishane, 2013). Policy uncertainty refers to omitted aspects of the policy or gaps in the policy provisions. Uncertainty creates a silence in policy requirements, the result of which is policy non-application in the omitted aspect allowing policy users and implementers to practice as they see best. In the case of construction projects, uncertainty in school infrastructure policy can result to non-performance of construction projects as schools' delay mounting new projects and halt existing projects in the short run as they adopt a wait-and-see approach on whether the policy uncertainty to be cleared. The study was anchored the punctuated equilibrium theory of policy and program theory of project management.

The study sought to analyze the following models.

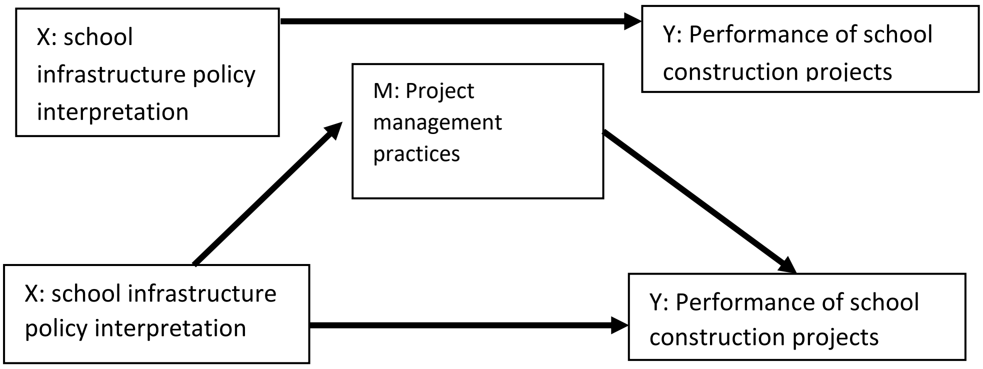

Figure 1: Models of analysis

2. RESEARCH METHODOLOGY

The study was a cross-sectional survey research using correlational convergent parallel design. The target population was 920 headteachers and 82 DEOs. Each school has a headteacher who also doubles in as the project leader for the school's construction projects. Headteachers are supervised by DEOs who are in charge of public schools in a district region. To determine the sample, the study used the sample size formula for a large population ($n=z^2$ (P)(Q)/ (level of statistical significance)^2 and then applied the Cochran finite population correction at 5% level of significance. Somaliland is demarcated into 13 regions which have 82 districts and 920 public primary schools (MoEHE, 2015). The determined sample was 257 headteachers and 22 DEOs. Multistage sampling was used. Purposive sampling was used to sample 7 regions with a total of 56 districts which have 735 primary schools and an equivalent number of headteachers. The criteria used for purposive sampling of regions was:

physical accessibility, national geographical spread, a high number of primary schools, the balance between rural and urban schools, secure, and not engaged in armed conflict. A sample of 257 headteachers was drawn from 735 headteachers using proportionate stratified random sampling with replacement. Simple random sampling was applied to pick 22 DEOs for interviews from the 56 districts, purposively sampled. The 257 headteachers filled questionnaires that were dropped and picked later. The questionnaires were anchored on a 5-point Likert attitudinal scale. Each variable was measured using 10 Likert scale items and one open-ended question. Semi-structured interviews targeted to collect data from 22 DEOs. Pretesting of the questionnaire was done on 28 headteachers. Reliability was ensured by the Cronbach alpha coefficient of internal consistency: α = 0.924. Construct validity was ensured by the use of proven variable indicators in constructing the questionnaire items. Content validity was ensured through peer review. Path analysis was used to assess the variable relationships and path coefficients were used to test hypotheses. Andrew Hayes Process tool was used to analyze the mediation effect. The following three equations were used to analyze the total effect, direct effect and indirect effect.

$Y = a_0 + cX + e_1$ ……………. total effect X_1 on Y

$M = a_1 + b_1 X + e_2$ …………… first part of the indirect effect

$Y = a_2 + c' X + b_2 M + e_3$ ……….…... direct effect and second part of indirect effect

Where Y is the dependent variable, X is the independent variable, M is the mediator variable, a_0, a_1 and a_2 are model constants, c is the total effect of X on Y, $b_1 = P_{21}$ and is the effect of X on M, $c' = P_{51}$ the direct effect of X on Y controlling for M, b_2, $= P_{52}$ the effect of M on Y while, e_1, e_2 and e_3 are disturbance terms.

3. FINDINGS AND DISCUSSIONS

3.1. Response rate and data testing

Of the 257 headteachers surveyed 253 questionnaires were completed and returned. Of these, 6 were dropped due to gaps in responses. The usable sample was 247. Twenty DEOs were interviewed. The high response rate was attributed to the short period between dropping time and picking time of the questionnaire which was 1 to 2 days. Shapiro Wilk test was used to test the data for normality. Data for policy interpretation, $D(247) = 0.991$, $P = 0.113$; project management practices, $D(247) = 0.995$, $P = 0.585$; and performance of construction projects, $D(247) = 0.994$, $P = 0.454$; were all normally distributed. Multicollinearity was tested using tolerance value (TV) and VIF: policy interpretation, $TV = 0.657$, VIF=1.523; project management practices $TV = 0.574$, VIF =1.741; indicating absence of multicollinearity. Homogeneity of variance was tested using the Levene statistic. For policy interpretation, $F(29, 212) = 1.087$, $P = 0.355$; project management practices $F(29,212) = 0.890$, $P = 0.633$ indicating that the variances of the explained variable (Y) were stable for different levels of the independent variable. The independent of error terms tests were also done using the Durbin Watson statistic which returned $D = 2.070$, indicating the absence of autocorrelation.

3.2 Descriptive analysis

The study sought data on projects completed 5 years before the study. The school's responses were summed up for each variable on a scale of 10-50 and grouped into three categories: disagree, not sure and agree. The results are shown in Table 1 below.

Table 1: Data collected on model variables

Variable	Response category	Frequency	Per cent	Mean	Standard Deviation
Performance of construction projects	Disagree/low (10-26)	68	27.5	29.60	7.12
	Not sure (26-34)	109	44.2		
	Agree/high (34-50)	70	28.3		
	Total	**247**	**100.0**		
School infrastructure policy interpretation	Disagree/low (10-26)	64	25.9	30.64	8.67
	Not sure (26-34)	91	36.9		
	Agree/high (34-50)	92	37.2		
	Total	**247**	**100.0**		
Project management practices	Disagree/low (10-26)	40	16.2	30.88	5.33
	Not sure (26-34)	133	53.8		
	Agree/high (34-50)	74	30.0		
	Total	**247**	**100.0**		

On the performance of construction projects, the respondents took a lukewarm position with a mean score of 29.60 with a response spread around the mean of 7.12. Of the 247 schools, 68 had low performance in their construction projects, 70 had high performance, while 109 had some of their construction projects attaining low performance and others attained high performance. On policy interpretation, 64 of the 247 schools reported having had school infrastructure policy interpretation issues, 92 schools had not had such issues while 91 schools were not sure if they had had policy interpretation issues concerning the school infrastructure policy. The mean was 30.64 and the standard deviation 8.67 indicating the respondents took a lukewarm position and the responses were more spread around the mean than the other two variables. Further analysis showed that most schools with policy interpretation issues were from rural regions. Of the 247 schools surveyed 74 indicated their project management practices were sufficient to yield high performance of their construction projects, 40 schools indicated inadequate project management practices that resulted to low project performance while, 133 schools were not sure whether their project management practices could lead to high or low performance of their construction projects. With a mean of 30.88 and the responses spread around the mean being 5.33, the response was slightly in favour of project management practices that yielded high performance of construction projects. This shows that project management practices exerted a positive influence on the performance of construction projects

Policy interpretation was positively correlated with the performance of construction projects but the correlation was not significant ($r = 0.64$, $p = 0.319$, $\alpha = 0.01$) indicating that it is not a key predictor of performance of construction projects without a mediating variable. The total effect was computed using linear regression analysis. The results are shown in Table 2.

Table 2: Regression Coefficients for Total Effect of Policy Interpretation on Performance of Construction Projects.

	Unstandardized Coefficients		Standardized Coefficients			Correlation		
Model	b	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part
Constant	27.999	1.668		16.783	0.000			
PI	0.052	0.052	0.064	0.999	0.319	0.064	0.064	0.064

Note: Dependent Variable: Performance of Construction Projects; n =247, α = 0.05.

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The total effect of policy interpretation on performance of construction projects with no other variable in the model was not significant: c = 0.052, t = 0.999, P = 0.319 (> 0.05) and R^2 = 0.004. The total effect model was: Y = 27.999+ 0.052X + e; e_1 = 0.052. This shows that no significant relationship exist between school infrastructure policy interpretation and performance of construction projects when there are no other variables in the model.

Path analysis was used to determine the direct and indirect effects exerted by policy interpretation on the performance of construction projects using the Hayes *Process* model 4 (Preacher, Rucker and Hayes, 2007). The results are shown in Table 3, Table 4 and Figure 2. Table 3 shows the results of the regression of X on M.

Table 3: Regression coefficients for the indirect effect of policy interpretation on project management practices

	Coefficient.	se	t	p	Confidence interval	
					LLCI	ULCI
Constant	20.0068	1.0213	19.5899	0.0000	17.9952	22.0184
Policy interpretation	0.3549	0.0321	11.0614	0.0000	0.2917	0.4181

Note: n =247, α = 0.05

In the X →M relationship, policy interpretation predicts project management practices (b_1 = 0.3549, t = 11.0614, p< 0.001). The value of R^2 was 0.3331 (p < 0.001), showing that 33.31% of the variations in M could be explained by variations in X. This shows that school infrastructure policy interpretation is an important predictor of the project management practices used in school construction projects.

The effect of M on Y and the direct effect of X on Y were analyzed. The results are presented in Table 4.

Table 4: Regression coefficients for the direct effect of policy interpretation and the indirect effect of project management practices on the performance of construction projects.

	Coefficient	se	t	p	Confidence interval	
					LLCI	ULCI
Constant	6.9218	2.0468	3.3817	0.0008	2.8901	10.9335
Policy interpretation	-0.3215	0.0491	-6.5419	0.0000	-0.4183	-0.2247
Project management practices	1.0535	0.0799	13.1811	0.0000	0.8961	1.2110

Note: n =247, α = 0.05

For the relationship between the independent variable and the dependent variable controlling for the mediator (X│M→Y), X significantly predict Y, (b = -0.3215, t = -6.5419, p<0.001). R^2 was 0.4183 (p<0.001) indicating that 41.83% of the variations in Y could be explained by the variations in both X and M. The following mediation equations were constructed:

$M = 20.0068 + 0.3549X + e_2.$ $e_2 = 0.0321$

$Y = 6.9218 - 0.3215X + 1.0535M + e_3.$ $e_3 = 0.129$ (e is the disturbance term)

Policy interpretation had a negative direct effect on the performance of construction projects of c' = -0.3215 (p<0.001) showing that the independent variable had a direct negative effect on the dependent variable when the mediator is in the model. The unstandardized indirect effect of X on Y through M was 0.3739 which when fully standardized, was 0.4548, CI [0.3505, 0.5642], showing that policy interpretation exerted a significant influence on the performance of construction projects through project management practices.

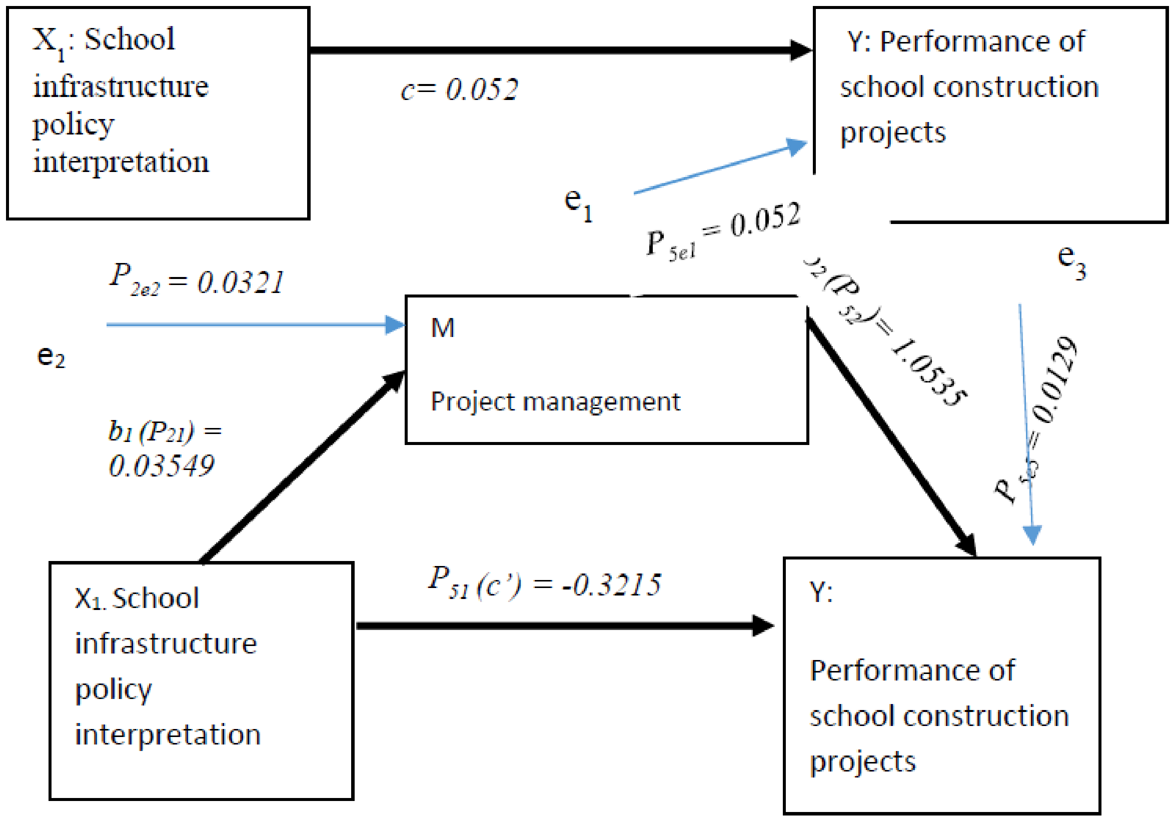

Figure 2: Path analysis model.

Figure 2 depicts the path coefficients for the model. The following hypothesis was tested:

H$_O$: X has no influence on Y. *H$_O$: $p_{51} = 0$*
H$_A$: X has a significant influence on Y. *H$_A$: $p_{51} \neq 0$*
With the value of p_{51} = -0.3215, p< 0.001, **H$_O$** was rejected and **H$_A$** accepted. Policy interpretation was found to exert a significant influence on the performance of construction projects when project management practices are in the model as a mediator.

CONCLUSIONS AND RECOMMENDATIONS

The results show that the direct relationship between school infrastructure policy interpretation and performance of construction projects is moderate negative and linear. This indicates that when school infrastructure policy interpretation improves and the policy is better understood, the performance of construction projects reduces taking into account changes in project management practices. This can be attributed to resource requirements aspect of policy interpretation. When the policy is properly interpreted, the resource and costs required to implement it and comply with its requirements at the school become clear. These costs add on to project costs resulting to an increase in the overall project costs which in turn may cause a reduction in project performance such as mounted projects delaying to complete and new projects delaying to start due to an increase in the projects' budgets.

The study further concludes that school infrastructure policy interpretation has a significant positive indirect relationship with the performance of construction projects through project management practices. When project management practices are taken out of the model there is no significant relationship between policy interpretation and performance of construction projects. This explains that school infrastructure policy works by influencing the project management practices that school management uses to implement school construction projects. Since policies tend to be restrictive, controlling, and often set standards to be met, school management adjust their project management practices in light of policy requirements and in some cases, in anticipation of new policy requirement. These changes in project management practices affect the number of projects mounted, speed of project implementation, number of projects completed, and number of projects delayed among other project performance parameters hence the positive indirect effect. The insignificant total effect of school infrastructure policy interpretation on the performance of construction projects aligns with reality in that, when there are no project management practices in the school, it follows that no projects are being implemented.

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