Contractors' Perception of Success Factors for Implementing Public Road Construction Projects

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Abstract

The Construction industry faces challenges and is increasingly failing to meet organizational objectives. This is evidenced by unsuccessful project implementation. Project failure oscillates between cost and schedule overruns and low-quality work, with construction organizations continuously failing to meet targets and losing significant funds annually. The public road construction subsector, which is currently in the spotlight for procurement irregularities, is equally challenged by the failures. Reports show that public road construction projects are not completed on time and within estimated budgets because of shoddy work and contract variations that negatively affect the government's goal attainment. This has resulted in several administrative reviews and investigations aimed at restoring sanity to successfully implement construction projects and meet government objectives. Studies are sprouting in the construction industry to determine successful project implementation factors that motivated this study's contribution. Based on the contractors' perception, this study aims to establish success factors for implementing public road construction projects. A cross-sectional research design using a structured self-administered questionnaire was adopted, and data was analysed in SPSS version 24 software. Findings reveal that monitoring activities and sanctions on staff are significant success factors in enhancing public road construction project implementation. At the same time, compliance with the public procurement regulatory framework, familiarity with this regulatory framework, professionalism among staff and perceived inefficiency of the regulatory framework are insignificant.

Keywords: Project success, Road construction, Success factors.

JEL: M40, M41 **SDG:** SDG 11, Target 11.2

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INTRODUCTION

The construction industry challenges oscillate between cost and schedule overruns with shoddy work, causing buildings to collapse (Kakitahi et al., 2013). These challenges are catalyzed by a lack of commitment and cooperation among construction stakeholders, failing the construction industry (Ntayi et al., 2010). A successful construction sector is important as it is responsible for nations' economic development (Shan et al., 2020b). Successful project implementation is achieved when the project is of appropriate quality and completed within time and budget (Atkinson, 1999). Furthermore, performance defines a successful implementation of a construction project that meets client objectives (Furneaux et al., 2006). Recent reports by the PPDA authority document noncompliance with public procurement regulatory frameworks amongst Procuring and Disposal Entities (PDEs), hampering the successful implementation of many projects PPDA Authority (2007) with local and international companies complaining about Uganda's procurement officials not following public procurement regulatory framework in implementing awarded contracts (Agaba and Shipman, 2007). Specific Australian examples show that cost and time overruns account for 48% of failures in project delivery, such as; the Sydney cross-city tunnel, Brisbane's river city motorway and M7 Clem Jones (Love et al., 2016a). Relatedly, Uganda's large construction projects have collapsed due to procurement irregularities; for example, the World Bank-funded Bujagali hydroelectricity project worthy of US$550 million was suspended after a high-ranking public official took US$10,000 bribe and influenced contract award (Prayas Energy group, 2002). Ambiguous national construction standards and ineffective structures are affecting Uganda's road construction projects with late delivery and over budget (White and Fortune, 2002). Increasing cases of public road construction irregularities have significantly failed these projects costing the government and masterminding economic retardation since the road sector is a core transport mode accounting for 90% of cargo freight and passengers (Ministry of Works and Transport, 2014). The public road construction subsector, characterized by procurement irregularities, is challenged with shoddy works, cost and schedule overruns, and failing government projects. The failed public road construction projects account for significant economic retardation attracting massive public protests from those whose economic activities are adversely affected. Delayed road construction and rectifying shoddy works costs tax payer severely because of sharp rising road construction cost (Ministry of Works & Transport, 2013). This manuscript is structured in the following sections: Abstract, introduction, literature review, research model, methodology, results, discussion, implications and contribution, recommendations, limitations, further research and conclusion.

LITERATURE REVIEW

The government implements public road construction projects on public behalf. This calls for successful project implementation when these projects meet public expectations in terms of quality, cost and time (Furneaux et al., 2006). These are key indicators measuring project success in meeting client satisfaction, which is called the iron triangle in construction projects (Chan and Chan, 2004). However, scholars are continuously looking for comprehensive success factors for implementing complex construction projects, with examples not limited to safety, functionality, monitoring and client satisfaction (Tayeh et al., 2018). Whenever public road construction projects are shoddily implemented beyond the time schedule and over budget, the client is dissatisfied, rendering the project unsuccessful and affecting public sector performance (Odeck, 2004). This is evidenced by complaints and administrative reviews common in road construction projects. The next subsections present systematic literature linking successful project implementation.

Compliance with the Public Procurement Regulatory Framework

Contract compliance is a cornerstone for successful procurement performance enforced through inspection and audit (Snyder, 2013). However, it requires defining well the scope of work for construction projects. A well-defined scope of public road construction projects is necessary for contract compliance and performance since compliance with the regulatory framework is a significant factor in determining construction project success (Tabish and Jha, 2011). Noncompliance with regulatory framework and project details underpins cost and schedule overruns, accounting for 30% of failed projects, including roads and bridges (Ford, 2011). Lack of compliance with construction standards explains why the construction industry is marred with collapsing buildings catalyzed by poor commitment and cooperation (Ntayi et al., 2010). Non-commitment to quality construction projects accounts for unsuccessful performance (Rwelamira, 1999). Because lack of compliance with quality workmanship significantly contributes to reworks in construction projects (Love et al., 1998). Public road construction projects undergo reconstruction attributed to noncompliance with required project specifications. Rework is an indicator of poor construction quality and lack of compliance with project specifications (Love et al., 2015). Such noncompliance causes quality deviations, failures and defects, costing clients and accounting for failed construction projects (Love, 2002). Costly public road construction projects undermine government goals and public expectations because they do not comply with project specifications, rendering them unsuccessful.

Familiarity with the Public Procurement Regulatory Framework

Familiarity with public road construction projects is important for staff implementing these projects. This determines how well they are knowledgeable about the regulatory framework and project detailed procedures beyond academic qualifications (Hunja, 2003). The team's familiarity will determine the fate of these projects, calling for well-defined project competence requirements to enable proper project staffing, who should regularly undergo specified training to cope with dynamic project requirements. This will help in mastering project requirements and make work easier and accomplished early (Sidwell et al., 2002). This is why contractors and project managers must fully familiarize themselves with the project scope in order to successfully implement public construction projects supported by a clear regulatory framework (Tabish and Jha, 2015). Additionally, public road construction stakeholders should be flexible in mastering project implementation procedures by shifting from rigid, ineffective methods that fail these projects. This should be enabled through continuous training (North, 1993).

Monitoring Activities

Monitoring activities are an organizational governance mechanism that ensures staff meet goals for successful project implementation (Obanda, 2010). Regularly monitor budgets for respective projects and take corrective actions to underpin successful project implementation (Schapper et al., 2006). Monitoring multi-stakeholder public road construction projects is crucial to determine how well the projects are progressing since successful organizational performance relies on monitoring effectiveness (North, 2016). This is evidenced in the USA's construction sector procurement, where effective monitoring reduced substandard works, cost overruns and corruption (Bartle and Korosec, 2003). Monitoring public road construction projects is necessary in order to compel construction implementation teams to meet targets by observing the right procedures ethically (Rutherford et al., 2007). This will ensure successful project implementation by meeting goals and value for money (Van Slyke, 2007). Despite all these recommendations, Kauppi and van Raaij (2015) discovered that monitoring is insignificant in influencing agent attitude towards the principal's goals. This confirms previous

studies that found monitoring activities on public construction projects to be an insignificant success factor (Tabish and Jha, 2015).

Monitoring is crucial for public road construction projects where the Government must clearly define responsibilities and regulations for supervising and controlling project staff (Jha and Misra, 2007). Effective monitoring is highly recommended for the construction industry to promote safety compliance during project implementation (Love et al., 2016b). Reports show that ineffective monitoring accounts for collapsing structures in Uganda's construction industry, accelerated by a lack of cooperation and commitment amongst the project implementation team (Ntayi et al., 2010). Such mixed findings on using monitoring as a governance mechanism motivates this study to expand the debate and contribute to the literature by investigating whether monitoring public road construction activities leads to the successful implementation of these projects.

Professionalism of Staff

Professionalism looks at staff competence through acquired skills, knowledge, experience and belonging to a professional body with an ethical code (Watson, 2002). This has helped construction industry operators decrease corruption through professional bodies and ethical codes for a successful industry (Sohail and Cavill, 2008). With procurement irregularities challenging public road construction projects, professionalism is evitable whereby the implementation team should be competent, skilled, ethical, experienced and knowledgeable with project details for successful implementation. That is why Australian's public entities are endorsed to proper staffing with skilled and experienced team in entire construction project procurement for successful project implementation (Furneaux et al., 2006; Australian Procurement & Construction Council, 2002). This has reduced noncompliance with the procurement framework, pushing risk to contractors and engaging costly external consultants in managing capital works procurement and construction projects (Furneaux et al., 2006). Investing in public road staff competence is important to boost technical skills from relevant qualifications and practice. Such additional specialized skills in project management through training, coaching and mentoring are vital for successful project implementation (Walker and Lloyd-Walker, 2015). Public road construction projects are unique and complex construction projects that should be carefully staffed with specialized skills determined in the tendering process (Runeson and Skitmore, 1999). This further requires maintaining a stable workforce with strong relationships among project teams for successful project implementation (Xiao and Proverbs, 2003).

The lack of a competent construction workforce challenges Uganda's construction industry by failing most construction projects tagged to poor training and recruitment methods (Alinaitwe et al., 2007). Such incompetence, poor project leadership skills, and inexperience signify Gaza Strip construction project delays (Enshassi et al., 2009). Globally, professionalism is challenging the construction industry with a shortage of skilled and experienced workforce. For example, South Africa, Jordan, and India, among others, affect project success (Tabish and Jha, 2015). Enhancing professionalism in the construction sector accounts for productivity and construction performance through a learning culture, transforming errors into experiences without blame among teams (Love and Smith, 2016). This attitude promotes professionalism among the construction team by accumulating knowledge and project delivery experience capable of implementing the project successfully (Love et al., 2015).

Sanctions on Staff

Sanctions involving threats and penalties are widely applied to tame deviant staff against organizational objectives (Scheer and Stern, 1992). These are equally essential for public road construction projects involving public funds to ensure that these projects meet public demands and government goals. Persistent procurement irregularities challenge the public road construction subsector, calling for such punitive measures to eradicate the vice (PPDA Authority, 2014). Laxity in enforcing punitive measures contributes to increasing irregularities accounting for most failed construction projects. Such challenges have forced multilateral bodies like the World Bank and the International Monetary Fund (IMF) to suspend funding of public road construction projects, calling for strict sanctions. For example, the World Bank suspended funding of fourteen public road construction projects in Bangladesh, marred by procurement irregularities (Mahmood, 2010).

Public road construction projects facilitate major governments' programs globally where effectiveness and efficiency are important to meet such demands. This should be promoted through a strong regulatory framework and sanctions to successfully implement these projects (Ministry of Works and Transport, 2012). Sanctions are commonly applied to perpetrators in the tendering process (Runeson and Skitmore, 1999). Different studies call for stringent actions on public procurement stakeholders to enforce compliance with required frameworks and value for money in implementing projects (Kakitahi et al., 2016). For example, cancelling contracts and blacklisting guilty companies for future contracts would ensure a successful construction industry (Sohail and Cavill, 2008). Effective sanctions are evitable to successfully implement construction projects Kenny (2007); otherwise, public procurement will continue losing significant funds, as evidenced by a US$100 million loss annually due to ineffective sanctions (Mbabazi et al., 2015).

Perceived Inefficiency of Public Procurement Regulatory Framework

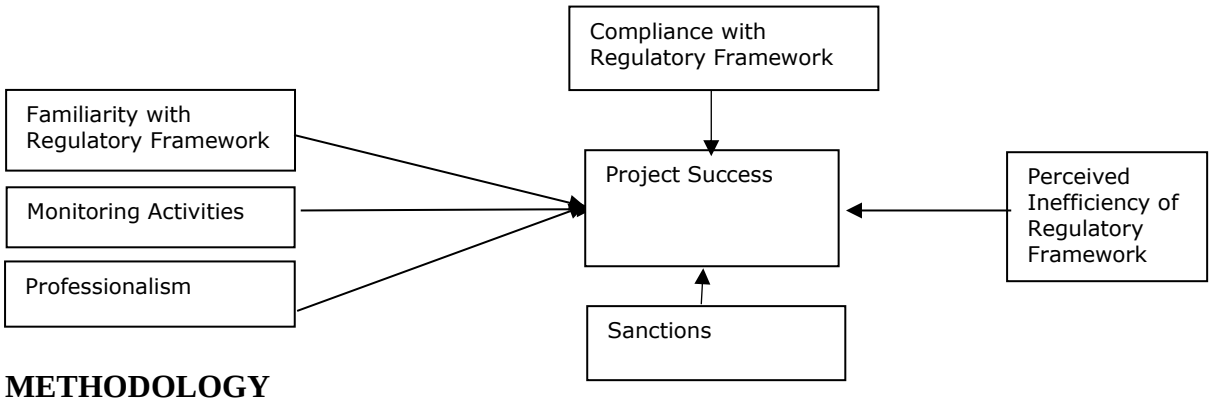
Whenever the regulatory framework is inconsistent and unclear, it is prone to manipulations by scrupulous public procurement stakeholders for personal gains. This is worsened by complex public road construction projects with scalar chain reporting systems, including multiple stakeholders. An efficient public procurement regulatory framework is necessary for these projects to enable implementers to understand and interpret easily. This increases the chances of implementing public road construction projects successfully with reduced manipulations and saving time. Little is known about linking perceived inefficiency with a regulatory framework to enhance the successful implementation of public road construction projects, which this study will explore.

Reports reveal that public procurement in East Africa is disorganized, with ambiguous public procurement regulatory frameworks calling for reforms for improvement (Odhiambo and Kamau, 2003). Such an inefficient regulatory framework would escalate procurement irregularities in public road construction projects, leading to cost and schedule overruns evidenced in the subsector (Daily Monitor, 5th November 2016). Additionally, unclear national construction standards and regulations challenge the construction industry with significant project failures (PPDA Authority, 2008). Such challenges ambiguity the regulatory framework governing the construction sector accounting for failed construction project implementation. An inefficient regulatory framework complicates stakeholders' compliance due to administrative issues and time wastage (Gelderman et al., 2006). Implementing public road construction projects is challenged with such inefficiencies, calling for clarity in the legal framework governing these projects to eradicate loopholes.

Research Model

The conceptual model illustrates the relationship between six independent variables and project success (H1-H6), as depicted in Figure 1.

Fig 1: Conceptual model



METHODOLOGY

Research Design

A cross-sectional research design was adopted because it dealt with causal effects between independent and dependent constructs that required testing relationships (Barratt and Kirwan, 2009). Further justification: Its statistical techniques are better for accuracy, validity, reliability, generalizability, and objectivity than qualitative design (Sekaran and Bougie, 2010). A population of 44 contractors awarded public road construction projects was used to statistically obtain a sample of 40 contractors (Krejcie and Morgan, 1970). After ascertaining actual projects, contract managers for respective projects were purposively selected to complete the questionnaire, resulting in 38 fully usable questionnaires representing an 86.4% response rate. The questionnaire was developed in three steps including; item generation, purification and validation. It was piloted in New South Wales, Australia, by giving it to construction managers whose views enabled rewording and deleting ambiguous statements. The final questionnaire was personally delivered to contract managers in Uganda through respective offices, where completed ones were later collected.

Validity and Reliability

Factor analysis in SPSS24 was conducted to obtain measurement items based on indicator loading. Pretesting the instrument was good for validity and reliability (Chandran, 2004). Content validity was determined based on construction managers' opinions, while construct reliability was determined based on Cronbach Alpha. Convergent validity measured the representativeness of measurement items in respective constructs useful in determining construct validity, and model development was determined through commonalities extracted. While discriminant validity ensured that the indicators should measure what they are supposed to measure, it was examined through factor loadings based on a rotated component matrix and determinant.

Data Processing and Analysis

Data was analyzed in SPSS24 after screening for completeness and accuracy.

Diagnostic tests: These were performed based on Ordinary Least Squares (OLS) assumptions to test for normality, linearity, multicollinearity and homogeneity as a requirement for cross-sectional data.

RESULTS

This section presents respective SPSS24 results based on the research objective and hypotheses. They include reliability tests and diagnostic tests for normality, linearity, collinearity and homogeneity. Furthermore, Exploratory Factor Analysis (EFA), correlations and hierarchical regression are presented. Cronbach alpha coefficients for all variables are above 0.7, indicating good internal consistency, as shown in Table 1 (Shan et al., 2020a). Skewness and Kurtosis statistics for all study variables were respectively within the range of ±3 and ±5, implying that data exhibits fairly normal distribution (Jondeau and Rockinger, 2003). ANOVA results show that the F-statistic is greater than 3 and the P-value is less than 0.05, implying that the project success model is linear ($F = 9.196$, $p = 0.000$) (Grewal et al., 2004). At the same time, collinearity results show that VIF < 5 and tolerance values > 0.2, implying that multicollinearity was not a problem (Hair et al., 2012). Levene test results for homogeneity show the p-value for project success is 0.238 based on the mean, implying that the data is homogenous.

Table 1: Reliability test results

Variable	N of Items	Scale	Cronbach's Alpha
Familiarity with PPRF	14	1 - 5	0.701
Monitoring activities	16	1 - 5	0.830
Professionalism	24	1 - 5	0.787
Sanctions	16	1 - 5	0.714
perceived inefficiency of PPRF	3	1 - 5	0.786
Compliance with PPRF	11	1 - 5	0.801
Project success	4	1 - 5	0.756

Table 2: Coefficient of determination.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.826[a]	.682	.608	.55661	1.807
a. Predictors: (Constant), Monitoring Activities, Perceived Inefficiency, Sanctions, Compliance with PPRF, Professionalism, Familiarity					
b. Dependent Variable: Project Success					

Exploratory Factor Analysis (EFA)

Factor analysis was adopted and helpful in obtaining factors to explain a study variable through correlational patterns and data reduction. The main aim of exploratory factor analysis was to help in further retention of items that can represent the variable very well (Davis et al., 2004). EFA was used to examine study variables and extract the most important factors that measured study variables using the Principal Component Analysis (PCA) method and Varimax rotation with eigenvalues >1 and factor loadings ≥ 0.5 (Stevens, 1996). This was further enhanced by communalities, that is, a proportionate variance of factors representing a particular study variable, interpreted as the sum of squared factor loading of a target variable (Tabachnick et al., 2001). The scree plot was verified as a representation of eigenvalues against the target variable number of factors, showing the contribution of each factor in total explained variance (Hughes et al., 2009). Before conducting factor analysis, the reliability of the sample should be established (Kariuki, 2018). To achieve this, sampling adequacy is determined through the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO-MSA) to justify whether factors analysis is appropriate (Shan et al., 2020b). A combination of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO-MSA) and Bartlett's test of sphericity is a set standard to be achieved before factor analysis is performed (Hughes et al., 2009). KMO-MSA was verified

with values ranging between 0 and 1; closer values to one are better, though 0.5 is acceptable, showing good prediction of the item by a particular factor that should be significant ($p < 0.05$) (Zhang et al., 2016). However, KMO values below 0.5 are inadequate (Shan et al., 2020b). The determinant was also considered in factor analysis with recommended values above 0.0001, showing no high collinearity. Meanwhile, a zero determinant value renders factor analysis impossible (Field 2012). Hence, the higher the value of the determinant than zero, the better. Communalities are important in establishing variable factors with 0.7 coefficient as very good. However, a coefficient of 0.4 is acceptable (Kariuki, 2018). Specific construct EFA results are presented in the proceeding subsections with KMO-MSA and communalities greater than 0.5, respectively, demonstrating a good convergent validity (Zhang et al., 2016). The extracted component rotated matrix for respective constructs showing factor loadings should be above 0.5 but below 0.95, demonstrating good discriminant validity (Urbach and Ahlemann, 2010).

Project Success

One component was extracted with an Eigenvalue of 2.326, and the total variance explained 58.1% of the success of public road construction projects. The KMO is 0.686, which is above the threshold of 0.500 (Shan et al., 2020b; Zhang et al., 2016). In addition, $X^2 = 38.2$ (Degree of freedom = 6, $p = 0.000$). This demonstrates that correlations among measurement indicators were high enough (Shan et al., 2020b). Communalities extracted are well above 0.5 for the factor loadings, demonstrating a good convergent validity of the items representing project success. The extracted component matrix shows factor loadings for four items representing project success, which are above 0.5 but below 0.95, demonstrating good discriminant validity among items of project success. The determinant value of 0.334 is very good, indicating no high collinearity in the factors representing project success.

Compliance

Three components were extracted with Eigen values above 1 and a total variance explained of 70.4% of compliance with the public procurement regulatory framework governing public road construction projects. The components extracted are timeliness of delivery, recording and damage/loss, explaining 37.2% of the variance, adherence explaining 20.7% and authorization explaining 12.5%. The KMO is 0.736 above the 0.500 threshold (Shan et al., 2020b). In addition, $X^2 = 180.6$ (Degree of freedom = 45, $p = 0.000$). This demonstrates that correlations among measurement indicators were high enough (Shan et al., 2020b). Communalities extracted are above 0.5, demonstrating a good convergent validity of the items representing compliance with the public procurement regulatory framework. The rotated component matrix shows factor loadings for items representing compliance with the public procurement regulatory framework, which are above 0.5 but below 0.95, demonstrating good discriminant validity among items of compliance with the public procurement regulatory framework. The determinant value of 0.004 is good, indicating no high collinearity in the factors representing compliance.

Familiarity

Five components were extracted with eigenvalues above 1 and a total variance explained of 73.9% of familiarity with the public procurement regulatory framework. The components extracted are familiarity with applicability, explaining 18.6% of the variance. Perceived clarity of public procurement regulatory framework, explaining 17.6%, qualifications, explaining 17.1%. Familiarity with exceptions, explaining 10.6%; and overall regulatory knowledge, explaining 9.9%. The KMO is 0.6, communalities extracted are above 0.5, demonstrating a

good convergent validity. In addition, $X^2 = 182.2$ (Degree of freedom = 78, p = 0.000). This demonstrates that correlations among measurement indicators were high enough (Shan et al., 2020b). The rotated component matrix shows factor loadings for items representing familiarity that are above 0.5 but below 0.95, demonstrating good discriminant validity. A determinant value of 0.003 is very good as an indication of no high collinearity in the factors representing familiarity with the public procurement regulatory framework.

Monitoring Activities

Four components were extracted with eigenvalues above 1 and a total variance explained of 69.0% for monitoring activities on public road construction projects. The components extracted are timely recording and proper storage, explaining 28.3% of the variance. Timely delivery or implementation, explaining 15.9%; actual delivery, explaining 13.6%; and authorized approval, explaining 11.3%. The KMO is 0.730 above the threshold, communalities extracted are above 0.5, demonstrating a good convergent validity of the items representing monitoring activities. In addition, $X^2 = 194.4$ (Degree of freedom = 78, p = 0.000). This demonstrates that correlations among measurement indicators were high enough (Shan et al., 2020b). The rotated component matrix shows factor loadings for items representing this variable are above 0.5 but below 0.95, demonstrating good discriminant validity. The determinant value of 0.002 is very good, indicating no high collinearity in the factors representing monitoring activities.

Professionalism

Four components were extracted with eigenvalues above 1, and a total variance of 71.3% was explained for the professionalism of staff involved in public road construction projects. The components extracted are confidentiality and professional body membership, explaining 27.1% of the variance. Professional behaviour and expertise explained 18.4%, training and integrity explained 13.6%, and competence explained 12.2%. The KMO is 0.624 above the threshold, communalities extracted are above 0.5, demonstrating a good convergent validity of the items representing professionalism. In addition, $X^2 = 109.9$ (Degree of freedom = 45, p = 0.000). This demonstrates that correlations among measurement indicators were high enough (Shan et al., 2020b). The rotated component matrix shows factor loadings for items representing professionalism that are above 0.5 but below 0.95, demonstrating good discriminant validity among professionalism items. The determinant value of 0.035 is very good, indicating no high collinearity in the factors representing professionalism among staff involved in public road construction projects.

Sanctions

Three components were extracted with eigenvalues above 1, and a total variance of 80.1% was explained for sanctions on staff involved in public road construction projects. The components extracted are the penalty for violation, explaining 37.2% of the variance; retaliations and known stipulated sanctions, explaining 25.3%; and credibility of sanctions, explaining 17.5%. The KMO (MSA) is 0.6, communalities extracted are above 0.5, demonstrating a good convergent validity of the items representing sanctions. In addition, $X^2 = 56.8$ (Degree of freedom = 15, p = 0.000). This demonstrates that correlations among measurement indicators were high enough (Shan et al., 2020b). The rotated component matrix shows factor loadings for items representing sanctions that are above 0.5 but below 0.95, demonstrating good discriminant validity among these items. The determinant value of 0.190 is very good, showing no high collinearity.

Perceived Inefficiency

One component was extracted with an Eigenvalue of 2.104 and a total variance explained of 70.2% for the perceived inefficiency of the public procurement regulatory framework governing public road construction projects. The components extracted are the ban on contractors, which explains 70.2% of the variance. The KMO is 0.662 above the threshold, communalities extracted are above 0.5, demonstrating a good convergent validity. In addition, X^2 = 33.0 (Degree of freedom = 3, p = 0.000). This demonstrates that correlations among measurement indicators were high enough (Shan et al., 2020b). The extracted component matrix shows factor loadings for items representing perceived inefficiency of public procurement regulatory framework is above 0.5 but below 0.95, demonstrating good discriminant validity among items of perceived inefficiency of public procurement regulatory framework. The determinant value of 0.391 is far away from the threshold of 0.0001, indicating no high collinearity.

Table 3: Correlations results

		Familiarity	Monitoring Activities	Professionalism	Sanctions	Perceived Inefficiency	Compliance with PPRF	Project Success
Familiarity	Pearson Correlation	1						
Monitoring Activities	Pearson Correlation	.629**	1					
Professionalism	Pearson Correlation	.247	.480**	1				
Sanctions	Pearson Correlation	.253	.342*	.478**	1			
Perceived Inefficiency	Pearson Correlation	-.198	-.236	-.428**	-.101	1		
Compliance with PPRF	Pearson Correlation	.362*	.099	.296	.223	-.147	1	
Project Success	Pearson Correlation	.418**	.666**	.514**	.599**	-.152	.217	1
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

Table 4: Project Success model regression summary results

	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**		**Model 7**	
Variables	**B**	**β**	**B**	**β**	**B**	**β**	**B**	**β**	**B**	**β**	**B**	**β**	**B**	**β**
(Constant)	5.274**		4.114*		2.545		1.316		.465		-1.625		-1.819	
Education	-.323	-.184	-.450	-.256	-.429	-.244	-.204	-.116	-.225	-.128	.005	.003	-.002	-.001
Gender	-.308	-.175	-.146	-.083	-.099	-.056	-.152	-.087	-.053	-.030	.108	.062	.102	.058
Years in current position	-.020	-.120	-.008	-.051	-.013	-.078	-.033	-.199	-.022	-.133	-.010	-.060	-.009	-.054
Professional training	.013	.024	.073	.130	.061	.108	-.043	-.076	.008	.014	-.004	-.007	.004	.007
Compliance			.399	.308	.215	.166	.203	.156	.185	.143	.117	.090	.120	.093
Familiarity with PPRF					.603*	.379*	-.145	-.091	-.038	-.024	-.092	-.058	-.076	-.048
Monitoring Activities							.956***	.718***	.759*	.570*	.730*	.548*	.714*	.536*
Professionalism									.287	.180	.102	.064	.142	.089
Sanctions											.597*	.381*	.582*	.371*
Perceived Inefficiency													.031	.035
R^2	.079		.149		.272		.529		.543		.619		.620	
Adjusted R^2	-.032		.017		.131		.419		.416		.497		.479	
ΔR^2	.079		.070		.123*		.257***		.014		.077*		.001	
ΔF	.711		2.640		5.230*		16.333***		.871		5.638*		.056	
F	.711		1.125		1.933		4.809		4.299		5.059		4.405	
Sig	.591		.367		.107		.001		.002		.000		.001	

DISCUSSION

This section discusses the results as presented above in line with the hypotheses. Both correlations and hierarchical regression analysis were performed using the Statistical Package for Social Scientist version 24 to establish the effect and level of significance of relationships among the study variables based on Pearson's two-tailed correlations (Field, 2013). This analysis helped determine the degree and direction of the relationship and further accept or reject stated hypotheses based on hierarchical regression significance level model 7, as discussed below.

Compliance and Project Success

According to correlational results, there is an insignificant positive relationship between compliance with the public procurement regulatory framework and the success of public road construction projects ($r = 0.217$, $p > 0.05$). This implies that compliance with the public procurement regulatory framework by staff on public road construction projects did not improve the success of these projects. On further assessment of regression results, there is an insignificant relationship between the two constructs, implying that compliance did not predict project success ($\beta = 0.093$, $p > 0.05$). This implies management shouldn't emphasise compliance with the public procurement regulatory framework during the implementation of public road construction projects. Whereas the findings contradict Tabish and Jha (2011), the institutional theory postulates that successful organizational performance relies on efficiency and compliance levels with institutional norms (Kondra and Hinings, 1998).

Familiarity and project success

According to correlational results, there is a significant positive relationship between familiarity with public procurement regulatory framework and project success ($r = 0.418$, $p < 0.01$). Implying that familiarity with the public procurement regulatory framework improved the success of public road construction projects. However, on assessing regression results, there is an insignificant inverse relationship between the two constructs, implying that familiarity with the public procurement regulatory framework did not predict public road construction project success ($\beta = -0.048$, $p > 0.05$). This implies that management shouldn't prioritize increasing their staff's level of familiarity with the regulatory framework governing public road construction projects. Despite the lack of prediction, management should not ignore the staff's level of familiarity completely since it improves project success corresponding with agency theory proposed staff training to enable their understanding and clarity in the principal's instruction for successful organizational performance (Chiappori and Salanié, 2002).

Monitoring Activities and Project Success

According to correlational results, there is a significant positive relationship between monitoring activities of public road construction projects and the success of these projects ($r = 0.666$, $p < 0.01$). This implies that monitoring activities improved the success of these projects. Furthermore, regression results show that there is a significant relationship between the two constructs, implying that monitoring activities predict and enhance public road construction project success ($\beta = 0.536$, $p < 0.05$). This requires management to increase monitoring of public road construction projects to allow the identification of areas of improvement and successful implementation of these projects. These findings conform to institutional and

agency theories whereby earlier studies established that effective monitoring of activities defines organizational success performance (Kondra and Hinings, 1998).

Professionalism and Project Success

Correlational results show a significant positive relationship between the professionalism of staff on public road construction projects and project success ($r = 0.514$, $p < 0.01$). This implies that professionalism among staff involved in public road construction projects improved the success of these projects. Meanwhile, regression results show that there is an insignificant relationship between the two constructs, implying that the professionalism of staff involved in public road construction projects did not predict public road construction project success ($\beta = 0.089$, $p > 0.05$). This calls on management to considerately maintain competence, integrity, and training of staff involved in public road construction projects since it improves the success of these projects. The results relatively contradict institutional theory normative elements and earlier studies that advocate for staff competence and knowledge for project performance (Walker and Lloyd-Walker, 2015).

Sanctions and Project Success

Based on correlational results, there is a significant positive relationship between sanction on staff involved in public road construction projects and public road project success ($r = 0.599$, $p < 0.01$). This implies that sanctions imposed on these officers improved the success of public road construction projects. This is supported by regression results showing a significant relationship between the two constructs, implying that sanctioning public road construction teams predict and enhance the success of these projects ($\beta = 0.371$, $p < 0.05$). This requires management to continuously punish and apprehend guilty staff involved in public road construction projects to make them fear being exposed, leading to successful project implementation and meeting government goals. The results fall within institutional theory proponents that postulate that organizational performance relies on the enforcement of its norms to meet objectives set (North, 2016).

Perceived Inefficiency and Project Success

Correlational results show an insignificant inverse relationship between the perceived inefficiency of the public procurement regulatory framework and the success of public road construction projects ($r = -0.152$, $p > 0.05$). This implies that the perceived inefficiency of the public procurement regulatory framework did not reduce the success of public road construction projects. Meanwhile, regression results show that there is an insignificant positive relationship between the two constructs, implying that the perceived inefficiency of the regulatory framework could not predict public road construction project success ($\beta = 0.035$, $p > 0.05$). This implies that management cannot emphasize banning negotiation between contractors and public officers during road construction, banning contract extension beyond the agreed period and banning underperforming contractors for efficient and effective regulatory framework governing these projects. Redefining the regulatory framework governing public road construction projects may not yield much in implementing these projects since various reforms for improvement have been implemented (Odhiambo and Kamau, 2003).

Coefficient of Determination (R2) and Model Fit Based on Model 7

Hierarchical regression was used as a multiple statistical method through step-by-step data analysis for establishing models (Pallant, 2007). Regression was helpful in determining the

predictive power of study variables, and under this, model summary, Analysis of Variance and coefficients results were scrutinized for model predictive power and accepting/rejecting hypotheses (Vanhonacker and Pan, 1997). In Table 4 Model 6, all demographic variables, as well as compliance with public procurement regulatory framework, familiarity with public procurement regulatory framework, professionalism of staff on public road construction projects and perceived inefficiency of public procurement regulatory framework have insignificant effect on project success since their p-values are above 0.05. While, sanctions on staff involved in public road construction projects and monitoring activities on public road construction projects with p-values below 0.05 have a significant effect on the success of these projects. Sanctions and monitoring activities predict projects success with respective beta values of 0.371, $p < 0.05$ and 0.536, $p < 0.05$ and account for 47.9% of public road construction project success ($R^2 = 0.$ 620, Adjusted $R^2 = 0.479$, $\Delta R^2 = 0.$ 001, $\Delta F = 0.056$, $F =$4.405, $Sig = 0.001$). This implies that monitoring activities of public road construction projects and sanctions on staff are key predictors enhancing the success of public road construction projects. This implies that according to the seventh model, two hypotheses (H3 and H5) are significantly supported, while two hypotheses (H2, Familiarity (r = 0.418**) and H4, Professionalism (r = 0.514**) are supported but statistically insignificant and two hypotheses (H1, Compliance and H6, Perceived inefficiency) are completely not supported. Finally, the model fitted well with a high coefficient of determination ($R^2 = 0.$ 620, $Sig = 0.001$) (Shan et al., 2020b).

Implications and Contributions

The study objective was to discover project success factors for implementing public road construction projects based on contractors' perceptions. Whereas agency and institutional theories advocate for compliance, sanctions, monitoring, familiarity, professionalism, and regulatory effectiveness in meeting goals, study findings show that monitoring activities and sanctions on staff involved in public road construction projects are key factors determining the success of public road construction projects. Compliance with the regulatory framework, familiarity with this framework, professionalism among the project team, and perceived inefficiency of the public procurement regulatory framework could not predict the successful implementation of these projects. Despite these results being supported by the two theories, they are limitedly compared with other findings as this is an emerging field of construction project success, particularly public road construction projects guided by these theories. Hence, monitoring activities and sanctions on staff grounded in agency and institutional theories are instrumental in implementing public road construction projects, necessitating the Government to emphasise them in meeting its goals. Management should pay attention to and emphasize these factors to implement public road construction projects successfully with the complexity of public road construction projects. Management should first understand the requirements for each project to comprehensively determine factors for the successful implementation of public road construction projects. Management has generally implemented programs that use sanctions and monitoring factors to improve service delivery. However, this study noted that these factors were applied ineffectively. Stringent penalties like confiscating property, regular transfers, refunding, forfeiture of future contracts and correcting shoddy works at no extra costs should be emphasized on those found guilty.

Effective monitoring of road construction projects by different bodies is encouraged but should be coordinated through well-defined roles and objectives to avoid clashes. Despite monitoring by different agencies being in place, the study observes lack of coordination and ambiguous roles and objectives definitions were a problem. Key measurement indicators for these constructs with high internal consistency are identified, which provides the Government and future researchers a solid ground to explore set targets. Over 80% of the national road

network is not paved. Effective application of these significant factors and increasing their awareness to public road stakeholders would increase the paved road network. The study has expanded construction management and public procurement literature based on contractors' perceptions by proving that monitoring activities and sanctioning staff involved in public road construction projects are significant factors responsible for the successful implementation of these projects. Researchers should shift from previously and widely used project success factors like time, cost, quality, and safety, among others Tayeh et al. (2018) and consider these new significant factors established here in meeting project objectives since little is known about the combined use of these constructs in the construction industry.

RECOMMENDATIONS

The government should proactively increase awareness of the importance of public road construction projects, using sanctions and monitoring government projects for economic development and meeting goals. Furthermore, emphasizes effective sanctions and monitoring mechanisms in implementing these projects based on this study's findings. Strengthening effective monitoring mechanisms, penalties, and legal enforcement would tame unethical public procurement stakeholders, especially on contract price variation and shoddy work during project implementation. Holding staff accountable for their tasks and actions during project implementation is inevitable.

LIMITATIONS

The study adopted a cross-sectional research design that was limited to specified one-time point data collection. However, the use of longitudinal research design would yield interesting results. Private contractors with views from contract managers were considered. Their representation of the private sector was insufficient, necessitating future researchers to involve more private sector firms with more respondents beyond contract managers.

FURTHER RESEARCH

Despite using six project success factors to explore contractors' perception of public road construction project success, these factors are not exhaustive, and there was limited participation. This calls on future scholars to expand the participation base by involving more players from the private sector and including more factors for a comprehensive project success model. Furthermore, for consistency and reliability, using the same factors in other sectors would concretise these results.

CONCLUSION

The study presents the introduction, theoretical support, literature review, methodology, analysis results, discussions, and implications and ends with areas of further research. The study explored public road construction project implementation issues affecting their success based on contractors' perceptions. Sanctions on staff and monitoring public road construction activities significantly influence public road project success. Once these factors are effectively applied, they would guide public road construction project implementation that could save the government significant funds and increase paved road networks for economic development.

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