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EARLY VIEW

DEMAND SIDE PERCEPTION ON SUCCESS FACTORS FOR IMPLEMENTING PUBLIC ROAD CONSTRUCTION PROJECTS

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ABSTRACT

Cost and schedule overruns, and substandard works are common factors failing organizations' objectives within the Construction Industry. Particularly, these factors are affecting public road construction projects and costing taxpayers. Researchers continue scanning the environment to establish why construction projects are ever behind schedule, over budgets, with substandard works and contract variations to identify significant factors for successful project implementation. This study expands the debate by looking at demand side perception in establishing success factors for implementing public road construction projects. This was motivated by governments' high expenditure on construction projects without meeting objectives. A cross-sectional research design with structured self-administered questionnaire was used to obtain views from three public entities representing demand side. Results analysed following PLS-SEM in Smart-PLS3. The research design enabled conducting statistical tests on validity, reliability, normality, multicollinearity, correlations and regression. PLS-algorithm and bootstrapping resampling approach were employed to determine relationship between variables by estimating path coefficients and significance. Path coefficients helped to determine strength, direction, significance and examine variance of dependent variable explained by combined independent variables. Results revealed that professionalism of staff, compliance with public procurement regulatory framework, monitoring activities and contractors' resistance to non-compliance are significant success factors enhancing public road implementation. Hence, adopting these factors would be a game changer in implementing complex road construction projects. In addition, complex construction projects in a dynamic construction industry requires continuous scanning to establish more factors and cope up with industry dynamics.

Keywords: Project Implementation, Road Construction, Success Factors.

INTRODUCTION

Cost and schedule overruns are common in the Construction Industry evidenced with collapsing building and substandard works that equally is facing public road construction projects (Alinaitwe et al., 2013). Construction cost variations, delayed project completion and shoddy works are cornerstone for project failures catalyzed by lack of commitment and cooperation among construction stakeholders (Ntayi et al., 2010). Interestingly, meeting client objectives defines successful construction project implementation Furneaux et al. (2006) that is tagged on quality, cost effective and timely completion (Simushi and Wium, 2020, Hussain et al., 2019). In Australia, non-compliant construction products affect construction industry performance by 50% causing unsuccessful project implementation (Australian Procurement & Construction Council, 2013). Furthermore, ineffective regulatory framework and structures are challenging public road construction projects, not complying with completion time and estimated budget. These challenges have failed construction project (White and Fortune, 2002). Such failures continuously bite public road subsector, challenging Government objectives and undermining economic development that relies on road transport responsible for 90% of cargo freight and passengers (Ministry of Works and Transport, 2014).

The construction sector accounts for economic growth worldwide by providing the infrastructure, such as roads, hospitals, schools and other social facilities (Mwelu et al., 2019, Saidu and Shakantu, 2016). For successful construction projects, it essential that construction projects are completed within the scheduled time, budget, predetermined scope and quality (Hamta et al., 2021, Luong et al., 2021). However, literature show that by the time a project is completed, the actual cost exceeds the original contract price by about 30% (Akin et al., 2021). World over, the construction industry is challenged by cost, time, and scope constrains. Globally, 9 of 10 transport infrastructure projects deviation from original cost. In Australia, cost overrun of 12.22% are reported and in Colombia, report reveal that public infrastructure projects experience 110% cost overruns (Gómez-Cabrera et al., 2020).

The transport sector plays a crucial role in economic development since an efficient transport system enables lower production costs, timely service delivery, access to markets, boosting tourism, promoting imports and exports. Despite Uganda's road sector underfunding, increasing construction and maintenance costs, transport and communication subsector contributed 5.3% to total GDP 2013/2014 and 5.1% 2012/2013 and its budget allocation increased by 17% 2015/2016 national budget with known record of taking lion's share compared to other sectors (Ministry of Works and Transport, 2015, Cornish and Mugova, 2014). This paper considers demand side perception to empirically establish success factors for implementing public road construction projects.

Public road construction project failures surround Uganda's economically dependable subsector. Construction projects are unsuccessful when they fail to meet government goals aligned with public expectation for example quality, cost and timely delivery (Love et al., 2019). Substandard works, cost variations and schedule overruns contribute significantly to unsuccessful implementation of these projects (Love et al., 2019). In Uganda, the Busega-Masaka (51Km) road project lost significant funds (with 52% contract price variations) and completion was delayed by three years (Uganda National Road Authority, 2014). The project was terminated midway, a new contractor appointed and the case is currently in court involving top government officials. Further examples of project failures marred with procurement irregularities are Kanoni-Ssembabule-Villa Maria (120KM) and Hima-Katunguru (58KM) road construction projects where UGX322 billion (AU$ 122.360M) was queried prompting Ugandan parliament ordering an investigation on 28 on-going road construction projects (New Vision, 20th October 2016). These persistent reports surrounding road project implementation failures motivated this research to establish success factors for implementing public road construction projects based on demand side perception. For purposes of the study reported in this paper, Demand side means government as the client in need of road construction project. While perception means the views of staff working with the government agencies who participated in this study. The three public entities include Ministry of Works, Uganda Road Fund and Public Procurement and Disposal of Public Assents Authority).

LITERATURE REVIEW

Project Success

Project success is defined as successful tasks accomplishment by meeting objectives (Renault et al., 2020). In addition, project success is the completion of the project within estimated time, cost, quality and meeting client's satisfaction (Kahvandi et al., 2020). Whereas quality, cost and time determines satisfactory contract performance, construction project is deemed successful if client satisfaction is achieved (Lee et al., 2021, Hussain et al., 2019). Besides Atkinson (1999) Iron triangle success indicators, other factors determining construction project success include; safety, functionality and satisfaction (Love et al., 2016, Walker and Lloyd-Walker, 2015).

Compliance with public procurement regulatory framework and Project Success

Public road construction projects are temporary unique endeavour that should comply with selected performance policies for successful implementation (Zadawa et al., 2018b). For example, complying with contract specifications and scope of works ensures successful project implementation (Kukoyi et al., 2021, Hussain et al., 2019). However, for compliance to ensure project success, project inspection and audit are crucial (Snyder, 2013). Literature show that

compliance with regulatory framework significantly influence successful performance of construction project (Sanga, 2020, Ameyaw et al., 2017). Disappointingly, road construction stakeholders are dissatisfied project cost and schedule overruns affecting 30% of roads and bridges performance (Ford, 2011). On average, 48% of infrastructure projects entirely are not completed on time, within estimated cost and expected quality (Love et al., 2018). A lack of compliance is affecting Australian construction industry (Gambo et al., 2016). Additionally, poor quality public road construction projects defines unsuccessful construction project performance (Marnewick et al., 2018).

Familiarity with public procurement regulatory framework and Project Success

Despite support of institutional theory DiMaggio and Powell (2015), little is known about the relationship between familiarity and project success that creates a literature gap this study would fulfill. Construction projects are complex and they bring together different stakeholder with varying perceptions and attitude in executing respective projects activities (Tayeh et al., 2018). This calls for careful planning and control right from project initiation stage to completion by making the project well defined and recruiting competent staff to implement these projects (Rafique et al., 2021). Staff competence is enabled through training to enhance their familiarity with project requirements (Decarolis et al., 2018). Continuously enabling staff competence through training is equally important for implementing public road construction projects (Zadawa et al., 2018a). This is because poor training account for flawed construction sector (Othman et al., 2018).

Enabling staff competence ensures accumulated knowledge and expertise in project implementation that creates competitive advantage and enhancing project success (Van Roy and Firdaus, 2020). Public road construction team must thoroughly understand its scope with clear governing regulatory framework to avoid manipulations. This is important for successful public construction project, (Tutesigensi et al., 2021).

Monitoring activities and Project Success

Most organizations employ monitoring mechanism to influence staff performance in successful project implementation (North, 2016). For example monitoring project budgets regularly enables quicker fault tracking and corrective actions made leading to successful implementation (Schapper et al., 2006). Additional examples show that successful performance of construction projects' relies on regular monitoring of activities undertaken (Hussein et al., 2020). For example, successful performance of United States' construction sector is attributed to effective monitoring and tracking of contractors (Bartle and Korosec, 2003). In China, monitoring underground construction projects enhanced successful implementation of these projects (Zhou et al., 2019).

Recent studies emphasize monitoring mechanisms to successfully implement quality construction projects (Moyo et al., 2022, Lapidus and Yves, 2018). These mechanisms encourage total supervision and performance monitoring of construction projects starting with contractors by reducing risks antagonizing successful project implementation (Hussain et al., 2019). Furthermore, effective monitoring of irresponsible construction staff ensures successful implementation of public construction project (Love et al., 2016). This is supported by institutional theory contending that successful organizational performance is glued on monitoring effectiveness (North, 2016). Thus, monitoring public road implementation team is paramount to avoid undesirable behavior and encouraging successful project delivery thereby achieving value for money (Van Slyke, 2007).

Professionalism of staff and Project Success

Professionalism is about competence in skills, special knowledge with experience and a member of a professional body exhibiting ethical code (Watson, 2002). Ethical codes are vital in controlling staff in construction industry (Owusu et al., 2017). Professionalism is inevitable for public road construction projects that requires using staff with competent skills, ethical, experienced and knowledgeable to successfully implement these projects (Hussain et al., 2019). Pheng and Chuan (2006) noted that professional competence is essential for successful performance and it is achieved through training, coaching, mentoring, developing and retaining competent workforce (Walker and Lloyd-Walker, 2015). This is vital for implementing public road construction projects since construction industry operators focus on professionalism to realize a free corruption industry (Sohail and Cavill, 2008). Professional experience is vital for successful construction industry (Zhang and Sunindijo, 2021). Interestingly, lack of construction expertise affects quality of construction projects in Australian (Rafferty and Toner, 2018).

Lack of professionalism is a barrier to project success Um and Kim (2018) that is globally challenging the construction industry. For example, shortage of skilled, qualified and experienced workforce in South Africa, Jordan, Gaza strip, and India among others affect project success (Tabish and Jha, 2015, Sweis and Bisharat, 2014). Equally, Uganda's construction industry is unsuccessful because it is marred by incompetent workforce lacking necessary skills in construction due to poor training and recruitment methods (Alinaitwe et al., 2007). Accordingly, expertise and professionals are needed for implementing construction projects (Tayeh et al., 2018).

Perceived inefficiency of public procurement regulatory framework and Project Success

A clear and simple regulatory framework governing complex public road construction projects is inevitable for road subsector players to understand and interpret easily (Kagioglou et al., 2000). This is important because it limits unethical manipulators to drive their ambitions progressively (Shan et al., 2017).

An efficient regulatory framework facilitates a timely road implementation process by eliminating frequent consultation with legal fraternity for interpretation (Mwelu et al., 2019). Such a framework would ensure a clear scope of construction projects that is important for successful implementation (Tayeh et al., 2018). Convincingly, inefficient public procurement regulatory frameworks affect successful implementation of procurement project in East Africa (Odhiambo and Kamau, 2003). Further international literature show that inefficient regulatory framework affect construction projects (Bapat et al., 2021). Hence, requiring a proper regulatory framework to govern construction industry.

**Contractors' resistance to non-compliance and Project Success**

Contractors compete for limited government contracts whereby winning such contracts relies on previous contract performance in terms of timely completion, quality workmanship and within contract budget. This compels contractors resisting bad decisions that will undermine contract performance and limit chances of winning future contracts. Notably, different public road construction stakeholders come to accomplish specific assignment and as they do so, they may have conflicting interest contrary to project success (Wright et al., 2001). Compliance meets resistance from different players with varying ambitions and means of successfully accomplishing project tasks (Babalola et al., 2016). This requires coordination among construction participants for project success by reducing risks associated with cost estimation (Hussain et al., 2019). Accordingly, contractors' capability and performance is inevitable for successful implementation of public construction projects (Hussain et al., 2019).

Sanctions on staff and Project Success

Sanction are coercive strategies involving threats and penalties levied on staff working contrary to predetermined targets (Zadawa et al., 2018b). Despite mixed reaction on using sanctions to achieve these targets, they are widely applied to tame deviant staff (Ofori-Kuragu et al., 2016). Applying sanction in public road construction projects is important given the current wave of procurement irregularities (New Vision, 28th July 2016). Failed construction projects are a consequence of either laxity in enforcing punitive measures or ineffective sanctions that encourage unethical acts among project implementers (Sanda et al., 2022).

Research Model

The model illustrates the relationship between seven independent variables and project success as depicted in fig1. This figure illustrates how the seven independent variables (factors) reviewed in literature influence the dependent variable (Project success).
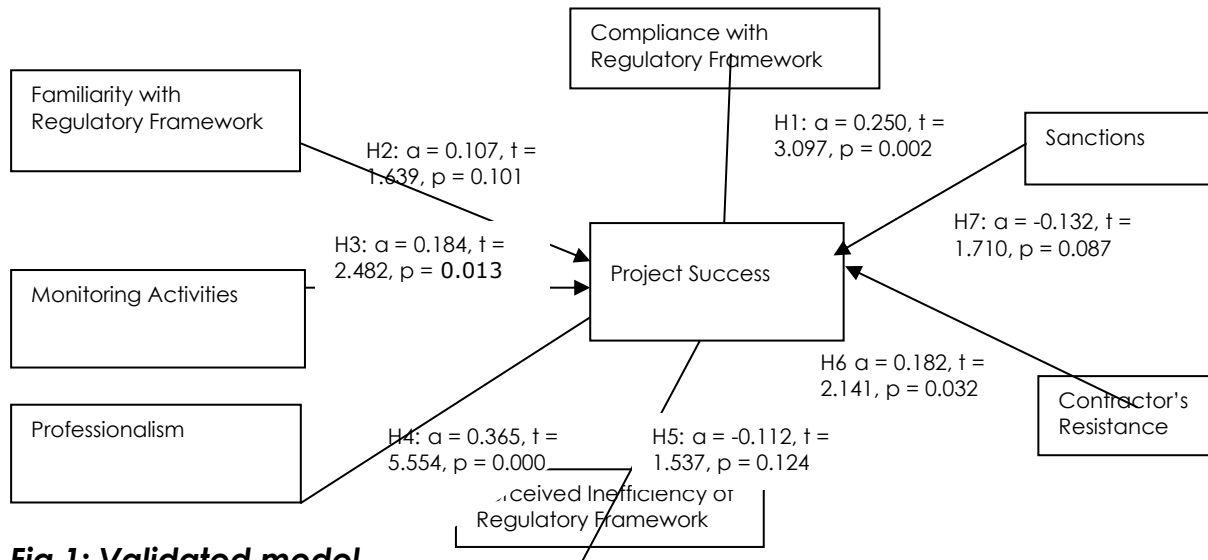
Fig 1: Validated model

METHODOLOGY

A cross-sectional research design based on questionnaire survey was used since hypotheses needed statistical testing to determine significance of variable relationships to develop the model and generalize results. This design was chosen because it is more accurate and able to produce valid and reliable results for generalization (Sekaran and Bougie, 2010). A sample of 157 was selected from 257 respondents from three public entities following (Krejcie and Morgan, 1970). Stratified proportionate random sampling was adopted to determine respondents from respective entities based on departments and simple random sampling was adopted to select final respondents who were given the questionnaire to complete.

The questionnaire was developed in three steps; generating items, purifying and validating the instrument. This was enabled by piloting the questionnaire to procurement officers and construction mangers in New South Wales Australia. Their comments resulted into deleting and rewording the instrument. The final questionnaire was physically delivered to respective public entities in Uganda through research assistant doubling as employees. Follow-up was made through telephone reminders and physically collected fully completed questionnaire resulting into 154 usable questionnaires representing 98.1% response rate. The questionnaire was measured on a five-Likert scale ranging from 1-strongly disagree to 5-strongly agree. This items were adopted from previous studies with slight modification to match the current study. A Likert scale is an efficient unidimensional scale that ensures all items measure the same thing (Zadawa et al., 2018a).

Measurement Model Evaluation

The measurement model (outer model) defines the relationship between manifested variables (indicators) and their respective latent variables. The measurement model evaluation was carried out to determine indicator reliability, construct reliability (internal consistency), Average Variance Extracted (AVE) and discriminant validity (Ringle et al., 2018). Indicator reliability ascertains how much of the indicator variance is explained by its variable established through indicator loadings. Strong indicator association was determined through composite reliability that measures representativeness of indicators to their respective variable. We used PLS-SEM to explore a three-step process in obtaining factor loadings, path coefficients and coefficient of determination (R^2). This was achieved by running PLS algorithm and evaluating indicator coefficients. Indicators with coefficients ≥ 0.7 were retained while indicators with coefficients < 0.5 were dropped. All variables were measured reflectively and dropping indicators with coefficients below 0.5 did not affect construct meaning (Müller et al., 2018).

Measurement Indicators

Variable	Indicators
Project success	• Road construction projects are implemented in accordance with specifications • Road construction projects are completed within schedule • Road construction projects are completed within budget
Compliance with public procurement regulatory framework	• Proper authorization of road construction projects • Timely delivery of road construction projects • Timely recording of road construction transactions
Familiarity with public procurement regulatory framework	• Precisely written regulatory framework governing public road construction projects for easy interpretation • Using staff who are familiar with implementation of public road construction projects • Employing staff with appropriate academic qualification to work on applicable road construction projects.
Monitoring activities	• Frequent inspections to check on timely recording of project progress • Frequent inspections to ensure timely project completion • Frequent inspections to determine proper storage methods to prevent damage of road construction materials.

Professionalism of Staff	• High professional integrity by staff • Professional judgement during decision making • High level of confidentiality • Practical experience in road construction • Required expertise in road construction.
Sanctions on Staff	• Penalties on those found guilty without any warning • Sanctions are implemented in secret • Sanctions with negative consequences are imposed.
Perceived Inefficiency of public procurement Regulatory Framework	• Ban on negotiation between contractors and public officers during road construction • Ban on contract extension beyond agreed schedule • Ban on underperforming contractors.
Contractors' resistance to non-compliance	• Contractors' readiness to take action against bad decisions • Contractors' knowledge on public road procurement process.

Table 1:   Measurement Indicators

Validity and Reliability

It was clear that over 94% of the respondents possessed a bachelor's degree and above. This implied that the majority of the respondents were academically qualified staff and competent to interpret and answer questions raised. This increased confidence and reliability of the responses obtained. The majority of respondents had professional qualifications, which was mainly in the engineering profession. This option was not listed in the questionnaire. Further reliability and validity tests were performed in Smart-PLS3 software by running PLS-algorithms with factor Analysis to obtain measurement items based on indicator loading. Partial Least Square Structural Modeling (PLS-SEM) using Smart-PLS3 was considered because of its wide application, robust techniques in handling non-normal data and simultaneous analysis and production of different results once compared to other statistical software (Sarstedt et al., 2019). Composite reliability determined construct reliability because its parameter estimation is accurate with close approximation than Cronbach alpha (Müller et al., 2018). Convergent was measured through Average Variance Extracted (AVE) to ensure indicators' representation in respective constructs to determine construct validity and model development (Hair et al.,

2012). Discriminant validity that ensure indicators should measure what they are supposed to measure was determined through Heterotrait-Monotrait Ratio (HTMT) (Rasoolimanesh et al., 2017).

Data Processing and Analysis

Data was imported into SPSS24 for screening to ensure completeness and accuracy before detailed analysis in Smart-PLS3 software. Data screening is necessary was necessary to solve multi-collinearity, normality issues, outliers and missing values to obtain highly inter-correlated indicators that enable internal consistency for reflective models (Ringle et al., 2018).

RESULTS

Reliability, validity, collinearity, normality, path model significance, coefficient of determination (R^2) and model fit (SRMR) were determined after running PLS-algorithms and bootstrapping resampling techniques in Smart-PLS 3.2.3 software (Ringle et al., 2015). All composite and indicator coefficients in Table 2 are above 0.7 showing good internal consistency and indicator reliability (Rasoolimanesh et al., 2019). All constructs' AVE coefficients in Table 2 are above 0.5 showing that the variable explains more than 50% variance of its indicators proving sufficient convergent validity (Ringle et al., 2018). HTMT coefficients are below 0.85 showing good discriminant validity as recommended recently (Rasoolimanesh et al., 2019). All VIF coefficients in are far below 5 proving that multi-collinearity was not a problem. Skewness and kurtosis statistics for all study variables are respectively within acceptable limits of ±3 and ±5 exhibiting fairly normal data distribution (Jondeau and Rockinger, 2003).

Variable	N of Items	Scale	Composite Reliability (ρ_c)	AVE	VIF
Familiarity	3	1 - 5	0.819	0.602	1.198
Monitoring activities	3	1 - 5	0.863	0.682	1.388
Professionalism	5	1 - 5	0.843	0.518	1.389
Sanctions	3	1 - 5	0.780	0.553	1.526
perceived inefficiency	3	1 - 5	0.799	0.571	1.551
Contractors' Resistance	2	1 - 5	0.771	0.629	1.431

Compliance	3	1 - 5	0.818	0.604	1.380
Project Success	3	1 - 5	0.867	0.686	

Table 2:   Reliability test results

Path Coefficients, Coefficient of Determination and Model Fit

PLS-Algorithms output was assessed for model identification and determine relationship prediction. This was based on path coefficients whereby coefficients ≥ 0.1 proves that independent variables are well represented and model identified (Hair et al., 2012). All the analysis converged at 11 interactions far below the pre-set 300-stop criterion that implied good convergence and prediction. Furthermore, to ascertain predictive significance for accepting and rejecting hypotheses, Bootstrapping was run with 5000 bootstrap samples and respective results are presented in Table 3. In addition, coefficient of determination was used to determine predictive performance for public road construction project success model. The results in Table 4 show that explained variances for the model is significantly good (R^2 = 0.527, p < 0.001) implying acceptable predictive performance (Rasoolimanesh et al., 2019). Consequently, 52.7% variance in public road construction project success is substantially explained by the seven project success factors. Finally, acceptable model fitting is important to determine whether the underlying theory is reflected in the data. This is simply an empirical evidence to prove that estimated model fits the data collected (Müller et al., 2018). Model fit was determined through Standardized Root Mean Square Residual (SRMR). As depicted in Table 4, SRMR obtained show that the overall model is significantly fitting well since the value is less than 0.08 (SRMR= 0.075, P < 0.001) (Rasoolimanesh et al., 2019). This implies that the estimated model compared to saturated model proved that the model in set-up theory represented by the conceptual model matches the collected data.

	Original Sample (a)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (t)	P Values
Compliance - Project success	0.250	0.247	0.081	3.097	0.002
Familiarity - Project success	0.107	0.109	0.065	1.639	0.101
Monitoring - Project success	0.184	0.185	0.074	2.482	0.013
Professionalism - Project success	0.365	0.370	0.066	5.554	0.000

Perceived inefficiency - Project success	-0.112	-0.112	0.073	1.537	0.124
Contractors' resistance - Project success	0.182	0.176	0.085	2.141	0.032
Sanctions - Project success	-0.132	-0.126	0.077	1.710	0.087

Table 3:   Path coefficients

	Original Sample (o)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (t)	P Values
Coefficient of determination (**R²**)	0.527	0.560	0.053	9.943	0.000
Standardized Root Mean Square Residual (**SRMR**)	0.075	0.094	0.007	11.365	0.000

Table 4:   R², Adjusted R² and Standardized Root Mean square Residual (SRMR)

DISCUSSION

Results discussion is based on path coefficient significance level that were verified to determine the relationship between variables by evaluating p-values and t-values.

Compliance and project success

There is a significant positive relationship between compliance with public procurement regulatory framework and success of public road construction projects (a = 0.250, t = 3.097, p = 0.002) at 1% significance level. This implies that compliance with public procurement regulatory framework by staff on public road construction projects predicted the success of these projects and requires management to emphasis compliance throughout project implementation. The findings are in line with (Amade et al., 2022, Zadawa et al., 2018b). Management should encourage proper authorization of road construction projects, timely delivery of road construction projects, timely recording of road construction transactions and achievable project objective. Institutional theory contends that organizational success depends on compliance with effective institutional norms (Kondra and Hinings, 1998). Complexity of public road construction projects with multiple stakeholders and directives from government and donors complicate implementation process with multi-stakeholders' demands. However, harmonising all the policies,

procedures and directives from different stakeholders is paramount for the success of these projects.

Familiarity and project success

There is an insignificant positive relationship between familiarity with public procurement regulatory framework and public road construction project success (a = 0.107, t = 1.639, p = 0.101) at 5% significance level. This implies that familiarity with public procurement regulatory framework predicted success of public road construction projects. Despite prediction, it is not sufficient since the p-value is more than 0.05 implying that familiarity with public procurement regulatory framework insignificantly enhances public road construction project success. Management should encourage qualified and competent staff involvement in public road implementation since these are key indicators measuring familiarity with public procurement regulatory framework. This is inevitable since many construction projects have failed due to using staff who are unfamiliar with project requirements. This is in line with literature showing that improving staff knowledge is important for successful construction sector (Khamaksorn et al., 2022, Munyasya and Chileshe, 2018).

Monitoring activities and project success

There is a significant positive relationship between monitoring activities of public road construction projects and success of these projects (a = 0.184, t = 2.482, p = 0.013) at 1% significance level. Implying that monitoring activities predicted success of these projects. Hence, necessitating management to effectively monitor public road construction projects to influence implementation team stick to project targets and identifying areas of improvement. This should be through frequent inspections to check on timely recording of project progress, timely project completion and proper storage methods. Effectively monitoring public road construction projects enhances the success of these projects and corresponding earlier studies (Osuizugbo et al., 2022, Mwelu et al., 2019). Agency and institutional theories confirm that effective monitoring is required for successful performance (Love et al., 2016). Successful procurement of public projects is highly dependent upon increased monitoring of procurement activities and management should actively monitor public road construction projects to determine if they are implemented in accordance with project specifications, on time and within budget. This would ensure that set objectives are achieved.

Professionalism and project success

There is a significant positive relationship between professionalism among staff and public road construction project success (a = 0.365, t = 5.554, p = 0.000) at 1% significance level. Implying that professionalism among staff involved in public road construction projects predicted successful project implementation. This requires management to emphasize competence, integrity and training of staff involved in public road construction projects to

strengthen professionalism capable of implementing public road construction projects successfully. Government should encourage high staff professional integrity, judgement during decision-making, high level of confidentiality, and employing practically experienced road construction staff with required expertise. This is in conformance with institutional theory and recent studies requiring staff competence for organizational success and project implementation (DiMaggio and Powell, 2015). Professionalism ensures project success when staff are knowledgeable with particular project requirements (Latiff et al., 2022, Giroud et al., 2018). Hence, investing in staff competence is important for public road construction projects. Management should determine project requirements from initiation stage through to project completion. This would help management to source the rightful personnel with required expertise and competence to execute the project.

Perceived inefficiency and project success

There is an inverse insignificant relationship between perceived inefficiency of public procurement regulatory framework and public road construction project success (a = -0.112, t = 1.537, p = 0.124) at 5% significance level. Implying that perceived inefficiency of public procurement regulatory framework predicted reduction in public road construction projects success confirming that successful organizations relies on effectiveness institutional norms (Oliver, 1991). This is further supported by the argument that successful public construction projects require stakeholders' understanding of the project scope with a clear governing regulatory framework capable of eradicating manipulations (Zhang et al., 2016). Whereas perceived inefficiency of public procurement regulatory framework reduces successful public road construction projects implementation, the reduction is not significant. This is attributed to tremendous improvement of the regulatory framework through numerous reforms given that public procurement regulatory framework has been unclear previously (Odhiambo and Kamau, 2003).

Contractors' resistance and project success

There is a positive significant relationship between contractors' resistance to non-compliance with public procurement regulatory framework and public road construction project success (a = 0.182, t = 2.141, p = 0.032) at 5% significance level. Implying that contractors' resistance to non-compliance with public procurement regulatory framework governing public road construction projects significantly predicted success of these projects. The results contradict previous studies in Netherlands that established contractors' resistance has an insignificant effect in public procurement (Gelderman et al., 2006). However, current findings are supported by recent compliance study on public road construction projects (Zulkeflee et al., 2022, Mwelu et al., 2018). Hence, management should empower contractors by increasing their knowledge on public road procurement process and encouraging them to take action against defiant public officers. Creating awareness among public road construction team will make them understand benefits of complying with

regulatory framework to meet Government goals. This should be aligned with organizational objectives with effective mechanism denying deviant public officers from retaliating (Gelderman et al., 2010). This is in line with institutional theory revealing that successful performance depends on perceived organizational norms by different stakeholders having specific reasons of accomplishing tasks correctly (Greenwood and Hinings, 1996). Despite contractors' commitment to fulfil their mandate, an effective regulatory framework is inevitable to support their actions.

Sanctions and project success

There is an insignificant inverse relationship between sanction on officers involved in public road construction projects and public road project success ($a = -0.132$, $t = 1.710$, $p = 0.087$) at 5% significance level. Implying that sanctions imposed on these officers didn't predict success of public road construction projects and thus management may not continuously threaten to apprehend staff involved in public road construction projects as may not lead to improvement in implementation process. The results contradict various studies and institutional theory that proposed sanctions for successful organizational performance and meeting its objectives (Chan and Owusu, 2017, North, 2016). This is because currently the Ugandan Government through the Parliament and Anti-corruption court have embarked on serious condemnation and prosecution of guilty public road stakeholders including imprisonment and recovering lost funds. Further, PPDA is empowered to punish deviant stakeholders and termination of contracts (PPDA Authority, 2008). Such measures have caused fear amongst public road implementation team in Uganda.

STUDY CONTRIBUTION

The study contributes to existing body of knowledge by proving that compliance with public procurement regulatory framework, monitoring activities on public road construction project, professionalism among staff concerned with public road construction projects, and contractors' resistance to non-compliance are significant factors responsible for successful implementation of public road construction projects. Previously, project success factors including but not limited to time, cost, quality and safety are widely applied (Tayeh et al., 2018). However, with complex construction projects in a dynamic construction industry requires continuous scanning to establish more factors and cope up with industry dynamics. This call for construction industry stakeholders to consider these emerging significant factors unearthed to implement construction projects.

CONCLUSION

The purpose of this research was to establish predictors of success factors for implementing road construction projects. This was motivated by numerous reports revealing cost and schedule overruns as well as substandard works as

key constraints surrounding the construction projects. The study established that compliance with public procurement regulatory framework, monitoring activities, professionalism of staff and contractors' resistance to non-compliance significantly enhanced successful implementation of public road construction projects. While, familiarity with regulatory framework, perceived inefficiency and sanctions did not enhance success of road construction project. For government to achieve value for money, increase paved road network and steer economic development, a sound public procurement regulatory framework, monitoring activities, professionalism and encouraging contractors to take action against bad decisions are paramount to successfully implement public road construction projects.

The study was limited to Uganda's three public agencies (Ministry of Works and Transport, Uganda Road Fund and Public Procurement and Disposal of Public Assents Authority) directly involved in public road construction; however, other agencies (I.e. Ministry of Finance, President's Office, among others)) indirectly involved in public road implementation were left out. Hence, future studies should consider other public entities. In addition, this study was limited to seven factors affecting the success of public road construction implementation. This calls for more studies to comprehensively establish more success factors beyond the seven factors in this paper for implementing road construction pjects.

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