

Supply risk management and timely completion of force account construction projects among local government authorities in Dodoma, Tanzania

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Abstract

Purpose – The study's purpose is to contribute to the supply risk management literature by examining its implications in Tanzania, specifically in the timely completion of force account construction projects in Local Government Authorities (LGAs).

Design/methodology/approach – A cross-sectional survey design was employed to gather data from 318 respondents in primary schools within the Dodoma region. A covariance-based structural equation modelling (CB-SEM) structural equation modelling was employed to examine the relationship of the variables.

Findings – The study's findings underscore the crucial role of supply risk management, including multi-sourcing, effective supplier selection, post-qualification of suppliers, and effective communication with suppliers in the timely completion of FA construction projects. Notably, effective supplier selection emerges as the most influential factor, significantly contributing to the timely completion of these projects.

Research limitations/implications – The study focused on LGAs in Tanzania. It is important to exercise caution when making broad generalizations about the findings. Also, the study was based on a cross sectional survey design; future research could consider a longitudinal design approach.

Practical implications – This study offers practical insights for procurement practitioners and members of the Force Account committee in the public sector, offering guidance on how to improve the management of supply risks and, consequently, enhance the timely completion of construction projects.

Originality/value – This study stands out in the literature by examining the implications of supply risk management on the timely completion of force account construction projects in Tanzania. It significantly enriches the existing knowledge of supply risk management, particularly in the context of effective supplier selection in public procurement. These insights are of great value to researchers, practitioners, and policymakers in the field.

Keywords Construction projects, Force account, Procurement, Supply risk management, Timely completion of projects

Paper type Research paper

1. Introduction

Globally, the successful completion of a project is significantly influenced by the implementation of a suitable procurement management plan (Deshpande *et al.*, 2020). To achieve a project delivery triangle, including cost, time, and quality, it is important to select a capable and suitable supplier who can deliver materials without any disruptions (Cengiz *et al.*, 2017). Also, it is critical to choose an appropriate procurement strategy, given that every project possesses distinct characteristics and demands (Ghosh and Sar, 2022). Supplier management, as among procurement strategies, must be considered in enhancing



the performance of construction projects because the organisation will be able to select the supplier who can meet the objectives of the project. According to [Ahsan and Kumar \(2018\)](#), a substantial portion of the overall project expenses is allocated to procurement in the majority of international projects. Consequently, there has been a growing scholarly focus on the effectiveness of performance-based contracts and the efficiency of supplier management ([Ambaw and Telgen, 2017](#); [Kumar et al., 2015](#)). As a result, this study intends to assess how supply risk management can be used in influencing the timely completion of the force account (FA) construction project.

In the context of Tanzania's public procurement, the acquisition of goods, services, and works is critical to ensuring the efficient operation of procuring entities and the delivery of public services ([Changalima et al., 2022](#)). Procurement of works is among the critical and important aspects of public organisations ([Mchopa, 2015](#)). Around 60% of the Tanzania budget belongs to construction projects (procurement of works), which include but are not limited to the construction of buildings, infrastructure development, repair and maintenance of existing projects, and construction of water projects ([The United Republic of Tanzania \[URT\], 2022](#)). These projects are crucial for the growth of sustainable national development. The FA approach was emphasised by the government to be employed in current construction projects all over the country ([Mchopa, 2015](#); [Mwishwa, 2022](#)). [URT \(2023\)](#) defines FA as the use of public or semi-public organisations or departments to construct or renovate public infrastructures while utilizing the existing workforce and only recruiting additional labour when necessary. In 2016, the Tanzanian government allocated funds to procuring entities for various construction projects, with the directives to use the FA approach for the execution of construction projects ([Matto, 2023](#)). However, these projects faced the challenge of suppliers delivering materials on time to the site, cost overruns due to poor recording of materials costs, and quality of materials used in construction projects. It is the basis of these problems that motivate the researchers to conduct the study on how supply risk management can influence the timely completion of FA projects.

The relationship between potential suppliers and buying organizations is crucial for achieving the timely completion of projects and the overall performance of construction projects. According to studies conducted by [Krop and Iravo \(2016\)](#), [Changalima et al. \(2022\)](#), and [Kimario and Kira \(2023\)](#), buying organisations regard suppliers as valuable assets. As a result, supply risk management within buying organisations may become critical to ensuring that building projects are completed on the expected schedule. From a global perspective, supply disruptions have become more common in the construction industry. [El-Baz and Ruel \(2021\)](#) opined that the issues of political instability, natural disasters, economic crises, and pandemic diseases such as COVID-19 harm the availability and supply of building materials for construction projects. Hence causes cost overruns, delays of projects, and quality problems. In Africa, supply disruptions are caused by insufficient infrastructure, limited industrial capabilities, and logistical constraints, resulting in delays and cost increases. Specifically, in Tanzania, risk management in building projects appears to be weak, insufficient, and inconsistent ([Msomba et al., 2018](#)). This suggests that the country is limited in prioritising adequate risk management. As a result, one area that requires special attention is supply risk management in the context of construction projects.

Construction projects performed using the FA approach in LGAs are unattractive because of delays in project completion, increased cost and inadequate testing of materials, which result in quality problems ([Matto, 2023](#); [Mchopa, 2015](#)). Furthermore, the audit conducted by the Public Procurement Regulatory Authority (PPRA) and Controller Auditor General (CAG) indicates the unfavourable performance of FA construction projects in LGAs due to the presence of delays and cost overruns ([PPRA, 2022, 2021](#); [NAOT, 2020, 2019](#)). The government, through PPRA, has issued FA guidelines to ensure the effectiveness of the

construction projects. The guideline insisted on the establishment of FA committees such as the procurement committee, construction committee, and inspection and receiving committee. These committees work independently to ensure the value of the FA project is achieved. Despite these efforts, there is still unfavourable performance in construction projects under the FA approach. As a result, this study intends to examine the influence of supply risk management on the timely completion of FA construction projects.

Similarly, this study is motivated by limited literature linking supply risk management and timely completion of construction projects in public procurement in Tanzania. Previous studies focus on business performance in relation to supply risk management (Munir *et al.*, 2020) and risk in supply chain management as a mechanism of disruption management (El-Baz and Ruel, 2021). Other studies focus on the influence of supply risk management on the performance of the organisation (Hoffmann *et al.*, 2013; Manhart *et al.*, 2020), but studies that examine the influence of supply risk management on the timely completion of FA construction projects in the angle of public procurement remain limited. As a result, this study intends to contribute to the body of literature by assessing the role of supply risk management in the timely completion of construction projects in Tanzania's public procurement.

2. Literature review and hypothesis formulation

2.1 Transactional cost theory

The Transaction Cost Theory (TCT) highlights that companies can increase their economic efficiency by reducing their transaction costs (Williamson, 1993). This theory offers a framework for examining how contractual interactions within a supply chain are governed. The idea clarifies the different elements that support inter-organizational cooperation in supply chains. The methods used in supplier management align with the interactions between buyers and suppliers and incorporate strategies for optimising the targeted gains. Transaction costs are obvious, and some may be hidden in buyer-supplier relationships depending on the type of supplier growth techniques (direct or indirect). Published research has provided some evidence linking supplier management techniques to reduced prices (Changalima *et al.*, 2023a; Lee, 2022).

TCT is applicable in construction projects because when estimating the project cost in building projects, uncertainty is a constant (Li *et al.*, 2015). There will be uncertainty about how the work will be done, about the working circumstances during the project's execution, and so forth. These unknowns pose hazards to the project; they could result in unforeseen expenses and jeopardise the project's overall budget. These extra expenses are sometimes referred to as transaction costs (Abdel-Galil *et al.*, 2022). Construction projects typically contain uncertainty because of the several parties involved in project contracting, project design, and project execution (Ikuabe *et al.*, 2020). Projects are fraught with a variety of uncertainties. These include estimates-related uncertainties (such as inadequate estimation, specifications, knowledge, etc.), contracting party uncertainties (such as work quality and dependability, performance, and motivation), and project cycle uncertainties (such as incomplete design and implementation), all of which have an impact on the project's cost and performance.

Also, in TCT, the relationship between supply risk management and transaction cost is established. For example, Wever *et al.* (2012) conducted a study on supply chain risk by using TCT in a dynamic and uncertain corporate setting. When there is significant uncertainty, transaction costs rise (Rindfleisch, 2020), and performance suffers (Munir *et al.*, 2020). Rindfleisch (2020) discovered that greater uncertainty resulted in increased transaction costs. These imply that the poor performance of the supplier in delivering materials for the projects is likely due to the high amount of uncertainty. If the uncertainty is less, supplier performance

will be high, hence supply risk will be avoided. As a result, it is better to control supply risk by reducing the transaction cost of finding a suitable and capable supplier, maintaining efficient supplier records, supervision cost, and following up on order costs. If these are ignored, it will increase the cost of the overall project.

2.2 Multi-sourcing

Multi-sourcing is a very important operation in procurement management as it allows the procuring entity to have multiple sources of supply instead of depending on a single source. This situation enables organisations to reduce the possibility of supply risks, ensuring the cost-effectiveness of delivering processes (Mehrjerdi and Shafiee, 2021). In this study, multi-sourcing is defined as the situation whereby the organisation uses more than one supplier in a construction project instead of depending on one source of supply. Multi-sourcing increases the chance of the organisation to have a reliable and continuity supply of materials from different suppliers. This is advantageous to construction projects because there will be assurance of supply of materials, thereby avoiding stoppage of the project for waiting materials. The literature appreciates the role of multi-sourcing in enhancing procurement performance. For instance, the study conducted by Khemiri *et al.* (2017) indicated that dealing with multiple suppliers as multi-sourcing strategies leads to supply risk reduction, quality of product, cost reduction and enhanced overall performance of procurement in the organisation. Similarly, Dong *et al.* (2022) emphasised that clear multi-sourcing helps to reduce the probability of supply chain disruption and enhance the continuity of the project. The reviewed studies recommend that efficiency in selecting multiple sources of supply in projects enhances the chance of improving the reliability of supply, risk management, and the success of the whole project. Hence, the present study focused on the angle of timely completion in FA construction projects through supply risk management. Based on the literature reviewed, the following hypothesis is proposed.

H1. Multi-sourcing influences the timely completion of FA construction projects.

2.3 Effective supplier selection

Organisations perceive suppliers as important assets in procurement management, as the success of procurement in an organisation depends on the selection of good suppliers (Krop and Iravo, 2016). Suppliers are regarded as assets because they facilitate the organisation's existence and continuity; without supplies, the organisation will not survive (Phochanikorn and Tan, 2019). Through effective supplier selection, the organisation can be sure of quality products, cost efficiency, and continuity of supply. Studies conducted by Nair *et al.* (2015), Changalima *et al.* (2023b) and Sharma and Joshi (2023) recognise the role of supplier selection and procurement performance as well as organisational performance. The studies insist that if the organisation puts much effort into selecting a good supplier, there is the possibility of achieving the intended objectives like assurance of quality products and timely delivery. The current study stands in the angle that effective supplier selection influences the timely completion of FA construction projects. Purchasing organisations can be able to improve their operational efficiency, supply chain operation and overall business performance by employing much effort in selecting a good supplier (Van der Westhuizen and Ntshingila, 2020). Therefore, it is very important to assess the achievement of timely completion of construction projects through effective supplier selection. According to the importance of supplier selection in procurement operations, the study proposes the following hypothesis.

H2. Effective supplier selection influences the timely completion of FA construction projects.

2.4 Post-qualification

For the procurement process to be completed efficiently, the post-qualification process is important. Since it helps to qualify suppliers based on their personnel skills, resources they own, and capability to meet the needs of the projects (Vörösmarty and Dobos, 2020). Through post-qualification, it is easy for organisations to avoid the risks of selecting incapable suppliers because the issues of financial capability, reliability, and technical competence will be checked (Mahmoudi and Javed, 2022). Studies conducted by Dobos and Vörösmarty (2023), Patil and Kumthekar (2016) and Jafari (2013) appreciate the role of post qualification of supplier/contractor and performance of procurement in the organisation. Further, the studies elaborate that high performance of the project is achieved if the post-qualification process is conducted efficiently through physical visits and verifying the accuracy of submitted documents. In the present study, post-qualification of suppliers is related to the timely completion of FA construction projects. Timely completion of projects in public procurement is very important because the organisation will be able to achieve value for money by avoiding delays and cost overruns (Sinesilassie *et al.*, 2017). Furthermore, timely completion helps the government quickly provide services to the public and meet their expectations promptly (Famiyeh *et al.*, 2017). As a result, it is relevant to assess the role of post-qualification processes in the timely completion of FA construction projects. We suggest the following hypothesis.

H3. Post-qualification influences the timely completion of FA construction projects.

2.5 Effective communication with suppliers

Communication facilitates feedback and understanding of the subject matter. Therefore, if there is effective communication with the supplier in the buying organisation, it helps to enhance a common understanding of the project requirements, such as quality achievement, quantities, and time of delivery (Murphy and Sashi, 2018). This organisation can achieve the intended objective because the misreading of information can be minimised; hence, the procurement process could be fast and accurate. Also, transparency and trust in a cooperative relationship can be achieved if there is strong communication (Msemwa *et al.*, 2017). It was believed that the maximum quality of service and reliability of the supplier is more achieved if the supplier is well informed and respected. The current study believes that effective communication with suppliers is related to the timely completion of FA construction projects. A body of studies shows that successful communication with suppliers is critical for a variety of reasons (Kimario and Mwangike, 2021; Loice, 2015). These include guaranteeing an efficient delivery timetable, preserving product quality, and improving overall procurement performance (Kimario and Mwangike, 2021). It is also widely considered that regular communication with suppliers improves supply chain performance for both suppliers and customers (Kim, 2017), hence boosting organisational performance through collaboration. Based on these assumptions, the present study hypothesised that.

H4. Effective communication with suppliers influences the timely completion of FA construction projects.

2.6 Conceptual framework

Figure 1 illustrates the conceptual framework utilised in this research. It was constructed through a review of relevant literature and the formulation of hypotheses firmly rooted in TCT. In academic research, a conceptual framework offers an organised map of important relationships of variables, concepts, and theories that help researchers create a logical and coherent structure for their studies (Kivunja, 2018). The model posits that supply risk management results in the timely completion of FA construction projects. Multi-sourcing,

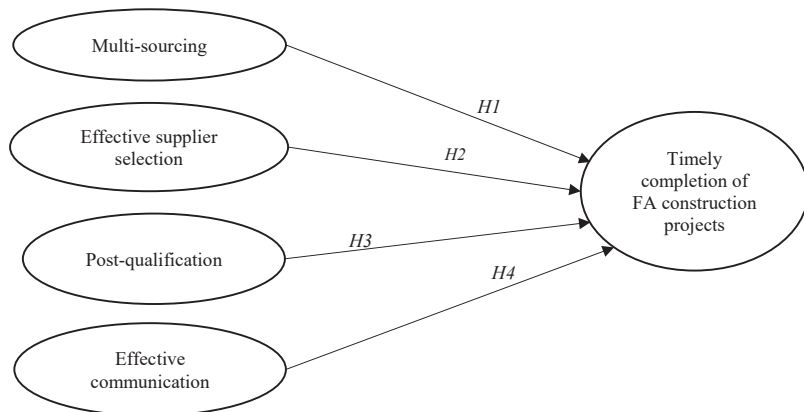


Figure 1.
Conceptual framework

Source(s): Figure by authors

effective supplier selection, post-qualification, and effective communication with suppliers are utilised to represent the dimensions of supply risk management. The model posits that there exists a direct link between these dimensions and the timely completion of FA construction projects. Structural equation modelling (SEM) can be employed to test the relationships between these variables and assess the overall fit of the model to the data collected during the research.

3. Methodology

3.1 Research design

Cross-sectional survey research was adopted, which entails gathering data at a specific point in time. This design is suitable because it is capable and efficient of gathering a large amount of data in a very short period, easy to minimise cost, and appropriate for the study, which intends to analyse the causal relationship of the variables (Setia, 2016; Changalima *et al.*, 2022). Also, the design is useful in this study because the study objectives were not to capture information on changes over time but to get a general snapshot of the relationship between variables of the study. However, to address the potential impact of time lag, the study employed robust statistical techniques to validate our model. Model fit indices such as CFI, TLI, and RMSEA were reported to ensure the model's adequacy. Measurement invariance was tested to confirm that constructs were measured consistently across different groups. Also, the common bias method was addressed by Harman's single-factor test in order to ensure that our results are not unduly influenced by measurement artefacts (Hazen *et al.*, 2015).

3.2 Study area

The study was conducted at primary schools in LGAs available in the Dodoma region. LGAs were selected based on the merit of having a large number of Procuring entities (PEs) in Tanzania. Also, the majority of construction projects were implemented in LGAs rather than in another category. For example, 455 construction projects belonging to LGAs were audited by PPRA in 2021, compared to 25 projects under Parastatal Organisations and 12 projects to Agencies; the audit covered 492 construction projects with a value of TZS 63 billion. The Dodoma region was selected as an area to collect the data concerning FA construction

projects in primary schools since it has a large number of such projects. For example, in the 2020/2022 Financial Year (FY), Dodoma region planned to construct 237 classrooms in primary schools for a budget of 2.71 billion. Similarly, a budget of 2.79 billion was set out for classroom and teacher housing building in FY 2022/2023 (URT, 2022, 2023). Selecting primary schools in the Dodoma region as an area of study based on the fact that there is availability of FA construction projects (URT, 2022).

3.3 Target population and sample

The study targeted population consisted of 1800 respondents who were obtained from 120 primary schools in 8 LGAs in the Dodoma region and 15 members of the FA committee. The sample size was 360 respondents calculated by means of the Yamane formula as used by previous studies (Changalima *et al.*, 2023b; Kazungu and Kubenea, 2023), taking into account a 95% confidence interval. However, during the process of collecting data, only 318 individuals, which is comparable to 88.3% of the total respondents, were able to provide their responses. In each selected primary school, simple random sampling was used to select 3 members of the FA committees from each selected primary school. The method was selected because it ensures that every member of the population (primary schools) has a fair chance of being chosen. By randomly selecting three members from each school, we can create a representative sample that correctly reflects the characteristics and variety of the primary school population. This reduces bias and increases the generalizability of the findings (Noor *et al.*, 2022). Members from the procurement committee, receiving and inspection committee and construction committee were selected based on the fact that all FA construction activities are supervised and controlled by them. Hence, the data were collected from the members of the FA committee, actually formed by the primary school teachers and representatives from the village committee.

3.4 Data collection method

The collection of data was conducted by using a questionnaire. Because the method is very powerful in collecting a large number of responses from respondents in a reasonable time. The questionnaire was structured based on the study's variables. Twenty-four items related to the study's main variables were used to formulate questions which were responded to by the FA committee members. Prior to full-scale data collection, the study used professional experts to pre-test questionnaires to ensure content validity. Also, the pilot study was conducted in the Morogoro region, where data was not collected in order to ensure the clarity and comprehensiveness of the questionnaire. Therefore, the study used twenty five experts who are capable and experienced in at least 5 years in FA projects and were considered in a pre-testing. Feedbacks were obtained and the final questionnaire was improved to accommodate their recommendations. Data for this study were gathered from March to December of 2023. Additionally, the surveys were physically dispersed, utilising the drop-and-pick technique in order to guarantee a greater response rate. This strategy was designed to offer respondents adequate time and increase the possibility of getting a sufficient number of completed questionnaires.

3.5 Variable measurement, reliability and validity

The supply risk management dimensions, such as effective supplier selection, multi-sourcing, post-qualification and effective communication with suppliers, were included in the study as independent variables, and timely completion of FA construction was referred to as the dependent variable. The questionnaire was designed based on the measurement items that were derived from previous research but with minor modifications to suit this study's scope. Specifically, the variable multi-sourcing was determined by the items adopted from

Chintapalli (2021) and Namdar *et al.* (2018). Effective supplier selection was measured by items adopted from Changalima *et al.* (2023a). Post-qualification processes were measured by items derived from Vörösmarty and Dobos (2020) and Jafari (2013). Effective communication with suppliers was determined by items adopted from Kimario and Mwangike (2021) and Loice (2015). Moreover, timely completion items were adopted from Maqsoom *et al.* (2021) and Yap *et al.* (2021). The study employed multi-item measures to quantify the constructs of the study, which were measured using a 5-point Likert scale as applied by previous studies whose items were adopted. The measures were selected based on their scientific validation in accurately assessing the constructs (Yağcı, 2019).

The findings presented in Table 1 indicated that the value of Cronbach's alpha (α) is greater than 0.7, which is within the acceptable range for measuring internal consistency

Variables/items	Factor loadings	CR	α	AVE
<i>Effective communication with the supplier (EFC)</i>		0.9151	0.9150	0.7292
• A large number of suppliers to deal with can reduce the risk of supply tremors	0.8131			
• More supplier base reduces the risk of dependence on suppliers and enables getting a reasonable price	0.8421			
• We rely on many suppliers to get the best supplier easier	0.8552			
• The risk of materials delays can be reduced if we deal with many suppliers	0.8591			
<i>Multi-sourcing (MSO)</i>		0.8932	0.8911	0.6781
• A formal supplier selection process is performed	0.7832			
• Our supplier selection criteria ensure only suppliers meeting our standards are selected	0.8051			
• The selection process has often identified suppliers with a history of high performance	0.8431			
• The least-cost consideration has always guided the determination of the supplier	0.8372			
<i>Effective supplier selection (ESS)</i>		0.8660	0.8612	0.6191
• A formal supplier selection process is performed	0.7873			
• Our supplier selection criteria ensure only suppliers meeting our standards are selected	0.8381			
• The selection process has often identified suppliers with a history of high performance	0.7732			
• The least-cost consideration has always guided the determination of the supplier	0.7953			
<i>Post-qualification (PSQ)</i>		0.8341	0.8291	0.5602
• We conduct post qualification to be sure of supplier performance	0.6661			
• We conduct post-qualification for the sake of determining the financial capability of the supplier	0.7832			
• We conduct post-qualification to be sure of the current commitment of the supplier	0.8002			
• Post qualification enables the procuring entity to get a reliable supplier	0.7333			
<i>Timely completion (TCO)</i>		0.7602	0.7581	0.5141
• The purchasing team ensures the availability of the required materials at the right time	0.6872			
• The project team ensured all activities in the project were conducted as planned	0.7082			
• All team members speak on time management in the project	0.7981			

Table 1.
Reliability and validity

Source(s): Table by authors

reliability. Similarly, higher than 0.7 indicated the value of composite reliability, which is also within the range recommended in the literature; the value was supposed to be higher than 0.7 (Hair *et al.*, 2006). Furthermore, there is the success of convergent validity since the value of standardised factor loading was greater than 0.6, and the average variance extracted (AVE) was employed. It was recommended that a value greater than or equal to 0.5 indicate that convergent validity was achieved. In this study, as shown in Table 1, all values of AVE are greater than 0.5. Lastly, discriminant validity was achieved since the square root of AVE, as shown diagonally in Table 2, was indicated to be higher than the value of the intercorrelation between the variables and other variables (Fornell and Larcker, 1981).

3.6 Data analysis

Data analysis was conducted using Covariance-Based Structural Equation Modelling (CB-SEM). CB-SEM is known as a very powerful and reliable multivariate statistical model for the analysis of latent variables (Hooper *et al.*, 2008; Hooper *et al.*, 2008). SEM was suitable for the research, which contained multiple constructs assessed using different numbers of items. Also, the study used CB-SEM because of having a large sample size, and the study was confirmatory research, which aimed to test theory rather than exploratory research, which is suitable for PLS-SEM (Hazen *et al.*, 2015). In the supply chain kinds of literature (Changalima *et al.*, 2023a; Kusi-Sarpong *et al.*, 2022), CB-SEM were used as a data analysis method to test the relationship of the variables, which is why this study considered CB-SEM to conduct analysis. Also, in construction research, CB-SEM was used in different studies (Zaman *et al.*, 2021; Khoza and Haupt, 2021).

4. Findings

4.1 Common bias method

The common method bias (CMB) was checked by using the Harman single-factor test. Unrotated factor analysis was conducted in this study in order to determine if the single component can be able to explain the majority of the observed variance. The results indicated that approximately 36.64% of the variance could be ascribed to a singular cause. The CMB could be an issue if the value is above 50% (Podsakoff *et al.*, 2003).

4.2 Evaluation of the measurement model

By using AMOS 21 software, Confirmatory Factor Analysis (CFA) was performed in order to assess the compatibility test and psychometric elements of the measurement model, as depicted in Figure 2. The goodness-of-fit statistics ($\chi^2/df = 2.0861$, Goodness Fit Index (GFI) = 0.9132, Comparative Fit Index (CFI) = 0.9560, Tucker-Lewis' coefficient (TLI) = 0.9472, Incremental Fit Index (IFI) = 0.9561, Adjusted Goodness of Fit Index (AGFI) = 0.8841, RMSEA = 0.0592) which shows the accurate fitness of the observed data in the model (Hair *et al.*, 2006; Hooper *et al.*, 2008). Internal consistency, convergent and

Variables	EFC	MSO	ESS	PSQ	TCO
EFC	0.8541				
MSO	0.3491	0.8242			
ESS	0.3382	0.4812	0.7871		
PSQ	0.5961	0.5002	0.3622	0.7482	
TCO	0.4862	0.5503	0.6503	0.5591	0.7101

Source(s): Table by authors

Table 2.
Discriminant validity

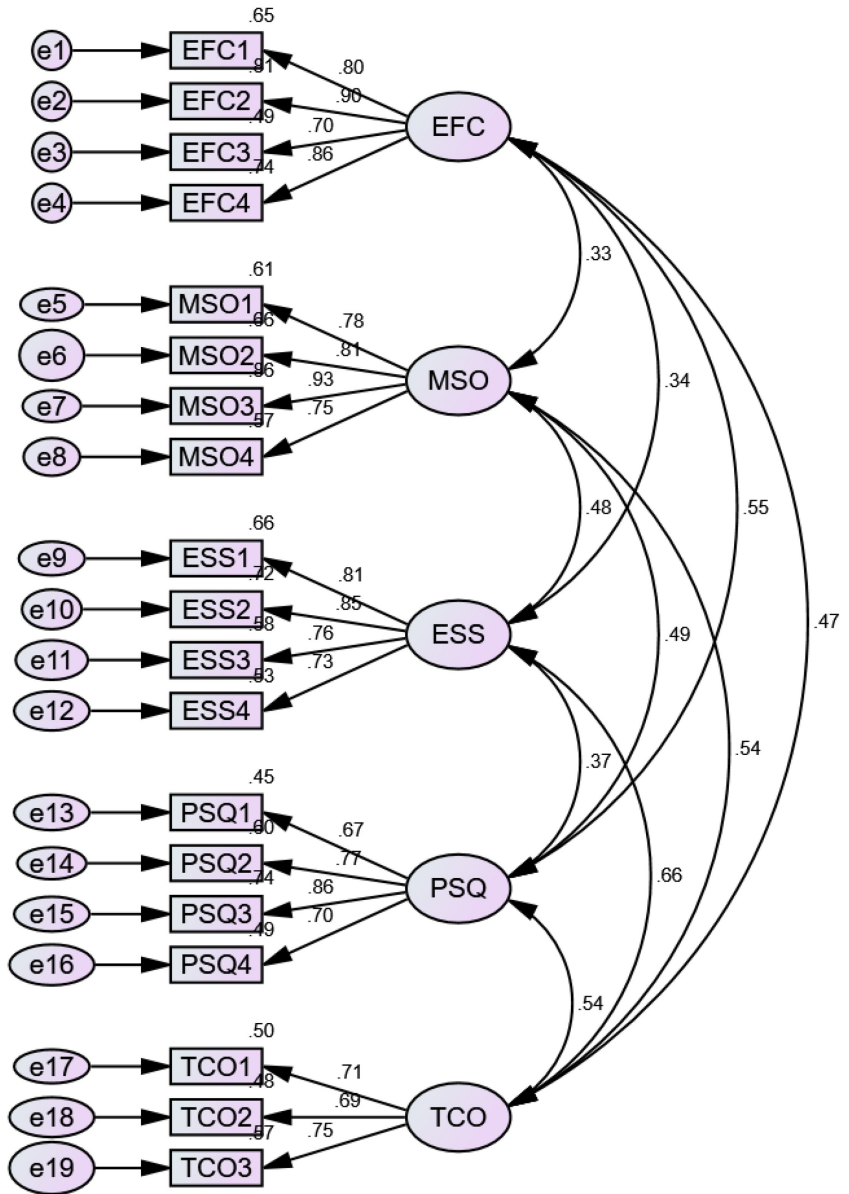


Figure 2.
Results of CFA

Source(s): Figure by authors

discriminant validity were assessed to evaluate the psychometric features of the latent variables and the measuring items.

4.3 Relationships among research variables in the structural model

The structural model's good fitness is evident from the fact that all fit indices, as shown in Table 3. This indicated that the findings of the study support and relate to the hypothesised structural model. A path analysis was also done to see how multi-sourcing, effective supplier selection, post-qualification, and good communication with suppliers affected the timely completion of the FA construction project. The study developed and tested hypotheses in order to examine the relationship of variables. As indicated in Table 3 and Figure 3, the results show that H1 (t -value = 2.6841, p = 0.0071 and β = 0.1501) implies that hypothesis 1 was supported. The findings indicate that the timely completion of FA construction projects is highly influenced by having effective supplier selection (t -value = 6.3461, p < 0.001, and β = 0.2753), as proposed in hypothesis (H2), the results show that H3 (p = 0.005, t -value = 2.8020, and β = 0.1872) indicates that hypothesis 3 was supported and the findings indicate that there is a positive significant relationship between effective communication with suppliers and timely completion of FA construction projects (p -value is less than 0.001, t = 2.1922, and β = 0.1142). Also, in these findings, effective supplier selection contributes much more than other variables towards enhancing the timely completion of the FA construction project as the t -value and β are greater than all variables.

5. Discussion

The findings of the study revealed that multi-sourcing is an important factor in explaining the timely completion of the FA construction project. This postulates that when an organisation uses multi-sourcing results in an increase in the timely completion of construction projects. Therefore, multi-sourcing is a significant predictor of the timely completion of construction projects and, hence, a necessary factor in improving the performance of the project. This relationship is based on the fact that dealing with a single supplier in a construction project can be a risk because supply disruptions will lead to delays in the completion of the project. Multi-sourcing strategies allow the organisation to be sure of continuity of supply because if one supplier fails to deliver timely and quality products for the projects, the organisation will switch to another reliable supplier. Furthermore, sometimes, the project experiences unforeseen circumstances caused by the supplier's failure to deliver the product, which can be solved if there is an alternative supplier. The findings are consistent with the study done by Khemiri *et al.* (2017), who established the link between multi-sourcing and procurement performance. Also, the finding is aligned with the study done by Dong *et al.* (2022), who insist on the importance of using multiple sources of supply in order to avoid the risk of supply chain disruption that a single supplier can cause. Furthermore, the findings support the

Hypothesised relationship	S. E	T -value	Estimate	p -value	Hypothesis decision
MSO \leftarrow MSO	0.0561	2.6841	0.1501	0.0071	Supported
TCO \leftarrow EFC	0.0521	2.1922	0.1142	0.0053	Supported
TCO \leftarrow ESS	0.0432	6.3461	0.2753	0.0001	Supported
TCO \leftarrow PSQ	0.0670	2.8020	0.1872	0.0282	Supported

Note(s): Model fit indices: χ^2/df = 2.0862, RMSEA = 0.0591, GFI = 0.9123, NFI = 0.9191, IFI = 0.9561, TLI = 0.9473, CFI = 0.9561, and AGFI = 0.8843

Source(s): Table by authors

Table 3.
Structural path
analysis results

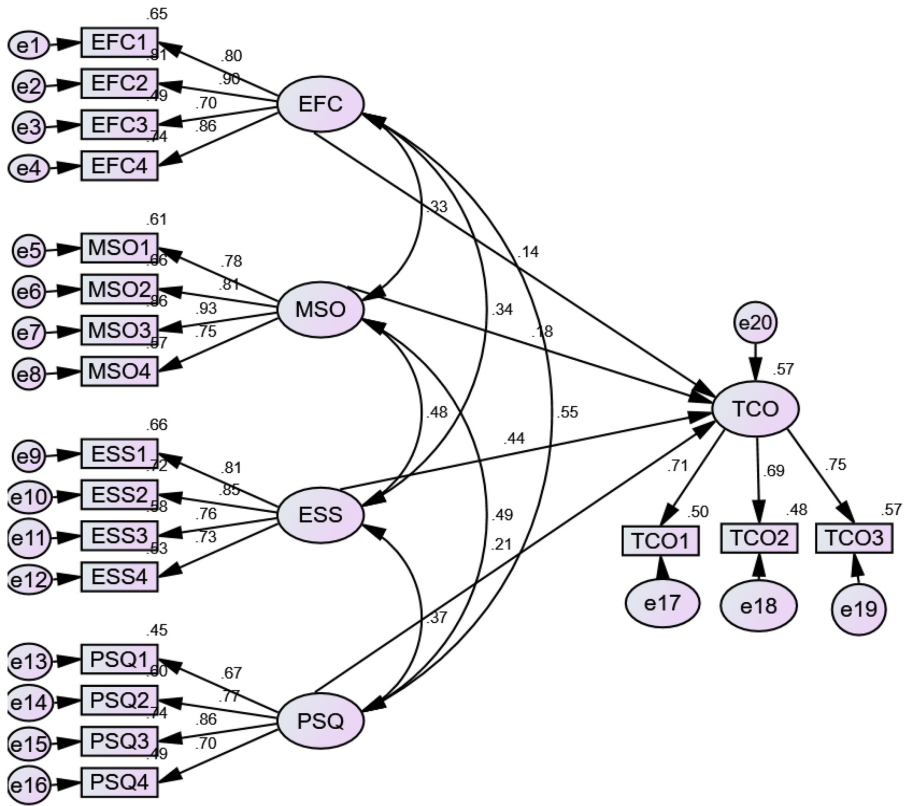


Figure 3. Structural model

Source(s): Figure by authors

assumption of transaction cost theory on asset specificity and uncertainty. Suppliers are regarded as assets in an organisation because the organisation incurs transaction costs to search for and select suppliers, but there is uncertainty about suppliers failing to supply quality products in a timely manner. This will increase the transaction cost of searching for a new supplier, but if there is a multi-source, the transaction cost will be reduced to its maximum.

The H2 of the study was achieved since the timely completion of FA construction projects is highly influenced by effective supplier selection. Therefore, effective supplier selection is the most significant factor which contributes to the timely completion of the FA construction project. The possible explanation for that relationship relies on the fact that timely completion of the project is more likely to not be achieved if the organisation selects an incapable supplier. For instance, if the supplier is not reliable, financial instability and lack of technical know-how lead to delays and increased costs of selecting another capable supplier. Therefore, choosing a supplier who is capable of delivering quality materials in a timely manner and cost-effectiveness is important for the survival of the project. Hence, the performance of the project will be achieved. Also, reliable suppliers with a good track record of timely deliveries help to improve project efficiency and reduce supply disruptions. The findings of this study aligned with Changalima *et al.* (2023a), who found that effective supplier selection is

important in enhancing public procurement efficiency because it avoids the cost of re-evaluating suppliers and searching for new suppliers. Furthermore, [Hosseini et al. \(2022\)](#) insist on the importance of supplier selection in reducing uncertainty and cost reduction in an organisation. Similarly, the finding aligned with TCT in the assumption of asset specificity, which insists on reducing transaction costs dedicated to a certain asset. Through effective supplier selection, the costs associated with re-evaluation, re-work and modification can be reduced.

Concerning the [H3](#) the findings indicate that the unit increase of post-qualification improves the timely completion of the FA construction project by 18.7%. This implies that among the predictors of timely completion of FA projects, post-qualification processes are not ignored. The explanation of this relationship is based on the fact that conducting post-qualification after selecting a supplier will help the organisation to get a competent and reliable supplier because the issue of financial capability, ownership of equipment, and quality of the product will be checked physically before entering into the contract with suppliers. So, the project management team was required to ensure the selection of a supplier was done after the completion of post qualification process for the sake of getting a capable supplier who could fulfil the requirements of the project timely. Furthermore, suppose the organisation will be able to examine suppliers thoroughly in the post-qualification stage. In that case, the ability of suppliers to supply building materials and other suppliers in the time indicated can be achieved. The findings are linked with Studies conducted by [Dobos and Vörösmarty \(2023\)](#), [Patil and Kumthekar \(2016\)](#) and [Jafari \(2013\)](#), who appreciate the role of post qualification of supplier/contractor and performance of procurement in the organisation. Further, the studies elaborate that high performance of the project is achieved if the post-qualification process is conducted efficiently through physical visits and verifying the accuracy of submitted documents.

Lastly, the findings indicate that there is a positive significant relationship between effective communication with suppliers and timely completion of FA construction projects. The reason behind this relationship is based on the fact that communication increases the chance of understanding. Thus, if the organisation is able to communicate effectively with suppliers leads to a common understanding of the requirements of the project. If the supplier understands the requirements of the project, he will be able to deliver the material on time and in the quality required. Also, through communication, misinterpretation/misunderstanding of requirements will be minimised, which could potentially delay the project. Clear and concise communication acts as a link to ensure smooth operations of the project because each part of the project can understand exactly what the project requires; hence, overall project performance will be achieved. These findings match with the study done by [Agarwal and Narayana \(2020\)](#), who found an association between procurement performance and proper communication with suppliers. Likewise, [Nguyen et al. \(2022\)](#) found that communicating with suppliers effectively is very important because it helps to improve innovation, knowledge and quality achievement. Furthermore, the findings are linked with TCT as communication with suppliers reduces the uncertainty of supply disruption. Thus transaction cost, which is associated with uncertainty of supply, will be reduced.

6. Conclusion and recommendations

The literature on the influence of risk management in the performance of construction projects is apparently available ([Abas et al., 2022](#); [Ghosh and Sar, 2022](#); [Amoah and Pretorius, 2020](#)). However, evidence-based studies are scarce on the role of supply risk management in the timely completion of FA construction projects in public procurement in developing countries like Tanzania. Based on this, the current study used the TCT to assess how timely completion of the FA construction projects can be achieved through employing supply risk

management strategies. On the part of the findings, it can be concluded that effective supplier selection is the main factor among the three that explains the relationship between supply risk management and timely completion of the FA construction project, as the coefficient beta is high compared to all factors. Therefore, all indicators of supply risk management were found to have a positive and significant relationship to the timely completion of the FA construction project. In this regard, employing supply risk management strategies will help the organisation to achieve the timely completion of the construction project because all risks associated with supplier failure will be solved through proper supply risk management which is scientifically proven in this paper. The study recommends that the members of the FA committee and procurement practitioners undergo training in order to improve their knowledge of how supply risk management strategies can be employed for the benefit of achieving timely completion of construction projects.

7. Implication of the study

7.1 Theoretical implication

By examining the influence of supply risk management on the timely completion of FA construction projects' study variables in the context of LGA in Tanzanian public procurement, our current study contributes to the available body of literature. This contributes to a wide understanding of the standpoint of timely completion of FA construction projects in Tanzania, which is very important for the development of the nation. Also, a study developed and tested a model of timely completion of FA construction projects from the angle of supply risk management for better understanding. In addition, the study contributes to the TCT, which insists on the importance of understanding how transaction costs in construction projects can be reduced by dealing with uncertainty and asset specificity. Therefore, the study adds to the TCT the issue of supply risk management in construction projects.

7.2 Practical implication

The study offers practical insights to practitioners involved in FA construction projects in public organisations. It provides practical insights to procurement practitioners and members of FA construction projects in dealing with supply risk management to enhance the timely completion of projects. Furthermore, the study emphasises how supply risk management can be employed to reduce the risk of delays in the completion of FA construction projects. In this case, the study's findings can be used by procurement practitioners and members of the FA committee in making decisions concerning the use of supply risk management in public procurement construction projects in Tanzania. Thus, procurement practitioners and members of FA committees in LGAs are the primary beneficiaries of the study's findings. In this regard, before entering into any construction project, it is important to consider and be proactive on how supply risk disruption can be solved. Hence, the issue of effective supplier selection, multi-sourcing, post-qualification, and proper record-keeping should be in place. Through this, public organisations can be sure of achieving timely completion of construction projects because supply risk management strategies were considered before the commencement of the project.

8. Limitations and areas for further study

The study was limited in terms of scope and geographical coverage. In scope, the study considered only the timely completion of the project as an indicator in measuring the performance of the construction project. Thus, other indicators, such as cost and quality, were not considered. Therefore, the study provides the basis for future studies to include other

measures of the performance of construction projects to extend this research. Furthermore, the study was conducted in Tanzania, specifically in LGAs, where the management of procurement practices, especially in FA construction projects, may differ from other contexts; hence, generalisation of the study's findings must be done with care and attention. This is relevant as the way procurement laws and regulations govern procurement conduct differs across countries. Also, the study was based on a cross-sectional survey design; future research could consider a longitudinal design approach. In addition, further study should consider using of other indicators of building performance, as the current study focuses primarily on timely completion; others should look at quality attainment and cost-effectiveness.

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