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A Framework for Assessing Organisational Governance Maturity for the Technical Audit of Public Works in Tanzania

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Abstract

Technical audit functions (TAFs) are often unaware of their maturity in governance, methodology, or outcomes due to the lack of a comprehensive framework for assessing technical audit maturity in public works. This study aims to develop a framework for assessing organisational governance maturity (OGM) in TAF of public works in Tanzania. It uses a mixed-methods design and data collected through document reviews, questionnaires, and interviews. Further, a cross-sectional survey of 128 technical auditors from seven TAFs in Tanzania was conducted to examine variables that enable OGM in TAF. The findings confirmed the reliability and dependability of each of the 56 enabling factors for OGM of TAF, and each of the five constructs. The analysis found that Cronbach's alpha for each construct exceeded the minimum threshold of 0.70, and the composite reliabilities ranged from 0.815 to 0.889, which exceeded the standard of 0.70. These results suggest that 55 factors that facilitate TAF's organisational governance maturity, due to their dependability, are grouped into five distinct constructs or dimensions. For the TAF to move from one maturity level to another, policymakers and TAFs need to use the framework to guide their assessment by understanding where it stands, its strengths and weaknesses, and identifying concrete steps to address them. This study advanced knowledge by developing the OGM framework for TAF, which integrates technical auditing and organisational governance.

Keywords: Framework, maturity levels, organisational governance, public works, technical audit function

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Introduction

Organisations are increasingly adopting maturity frameworks and models to strengthen management and governance practices (Brooks et al., 2015; Jääskeläinen et al., 2022). The fundamental principle of maturity is that organisational processes can progress through defined stages of development toward more systematic and capable practice (Carvalho et al., 2019; Gökalp et al., 2022). One of the primary challenges is that technical audit functions within public works may lack a clear understanding of their maturity in governance, methodology, or outcomes (Likha et al., 2022; Wilkinson, 2014). Many technical audit functions operate without a clear framework or benchmark for assessing their maturity, leading to inconsistent approaches to auditing public works projects (Likha et al., 2022; Thakur & Mishra, 2022).

Although established project management maturity models such as PM2 and OPM3 provide structured approaches for assessing organisational project management capability, they are not designed to support technical auditing activities (Ranasinghe et al., 2025). These models primarily evaluate the maturity of management processes and governance practices at an organisational level, rather than the technical correctness, compliance, or integrity of project implementation (Jääskeläinen et al., 2022). Consequently, they lack the audit-oriented mechanisms, such as evidence traceability, objective conformity criteria, and independent verification, required for systemic technical audits. This limitation highlights a gap between existing maturity frameworks and the needs of technical auditing in complex, engineering-intensive projects.

The absence of comprehensive frameworks that measure the maturity and governance of technical audits in public works is one of the significant gaps identified in the literature (Likha et al., 2022; Wilkinson, 2014). Although numerous auditing frameworks exist, relatively few address the specific requirements of technical auditing for construction and engineering projects, which require specialised knowledge. Existing frameworks commonly emphasise audit processes while giving less attention to broader organisational governance factors that influence audit quality and impact, including leadership, resources, and continuous improvement mechanisms (Likha et al., 2022; Wilkinson, 2014). Within public-works organisations, there is therefore a need for a structured framework that assesses the maturity of technical audits and the organisational factors that influence audit effectiveness.

The lack of a structured framework to assess organisational governance maturity creates several challenges for the quality and focus of technical audits. Wilkinson (2014) argues that weakly defined organisational maturity can reduce the effectiveness of an audit function and limit its contribution to accountability and service-delivery improvement. This lack of self-awareness means that technical audit

functions may be unsure of their strengths, weaknesses, and areas for improvement (Hemici & Kontogeorga, 2020). Without understanding their maturity levels, these functions cannot strategically prioritise improvements or focus on the most critical areas to enhance their effectiveness and value (Hemici & Kontogeorga, 2020; Wilkinson, 2014). Therefore, this study aimed to develop a framework to assess organisational governance maturity for technical audits of public works within public-sector organisations in Tanzania.

Literature Review

Overview of the Technical Audit of Public Works

Public infrastructure projects are complex and require substantial resources and financing for successful execution (Montalbán-Domingo et al., 2021; Volden & Welde, 2022; Zhuravlev et al., 2022). Because of their scale and public significance, they have important implications for public value, safety, and service delivery (Montalbán-Domingo et al., 2021). Public infrastructure projects must comply with relevant rules, building codes, and safety requirements to support safe and efficient construction and operation (Montalbán-Domingo et al., 2021).

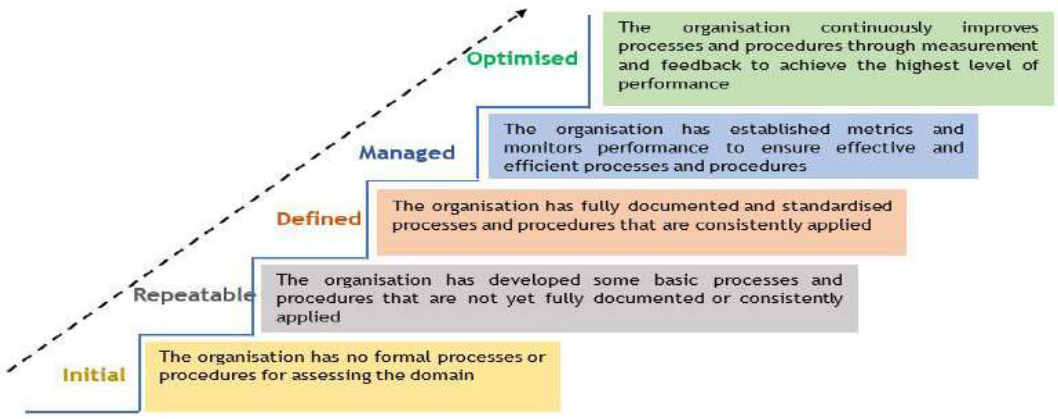
Sichombo et al. (2009) define technical auditing as a separate and unbiased evaluation and advisory process used to assess the efficiency and effectiveness of an organisation's operations. A technical audit is a specialised evaluation conducted by a professional engineer in a relevant field to identify shortcomings or areas requiring improvement in public infrastructure projects (Zhuravlev et al., 2022). The technical auditor assesses project procedures, systems, and technical elements throughout design, implementation, and commissioning (Kučera et al., 2018; Thakur & Mishra, 2022). A technical audit may examine whether the intended scope has been fulfilled, whether deliverables meet specifications, whether implementation follows required timelines, and whether the project provides value for the resources invested (Likha et al., 2022; Volden & Welde, 2022).

Overview of the Organisational Governance Maturity

The King IV Report positions governance as a holistic, values-driven system aligned with global governance standards rather than a narrow compliance or auditing exercise (Makhura, 2021). It integrates principles such as ethical leadership, sustainability, stakeholder inclusivity, transparency, and accountability and is consistent with broader infrastructure-governance principles (Organisation for Economic Co-operation and Development [OECD], 2017; Ramalho, 2020). King IV shifts the focus from compliance checking toward mature decision-making structures that guide how organisations are directed and controlled over time, emphasising outcomes-based governance, ethical culture, good performance, effective control, and legitimacy (Ntjane, 2022). This broader framing strengthens the understanding of governance as an adaptive, strategic discipline grounded in leadership behaviour, organisational culture, accountability, and long-term value creation.

A maturity framework is a systematic approach for evaluating an organisation's maturity in a defined domain such as governance, project management, information management, or organisational capability (Brooks et al., 2015; Jääskeläinen et al., 2022; Wibowo & Taufik, 2017). It provides a structured basis for progressively improving processes, practices, and results. Such frameworks generally specify criteria or practices that distinguish successive levels of maturity, with later stages building on capabilities established at earlier stages (Carvalho et al., 2019; Gökalp et al., 2022). In governance settings, this allows relevant attributes to be identified, maturity stages to be defined, and criteria to be specified for each stage. Many maturity models use staged structures with approximately five levels (Gökalp et al., 2022; Kagoya & Gilbert, 2020), as illustrated in Figure 1.

Figure 1: Maturity Levels in a Typical Framework



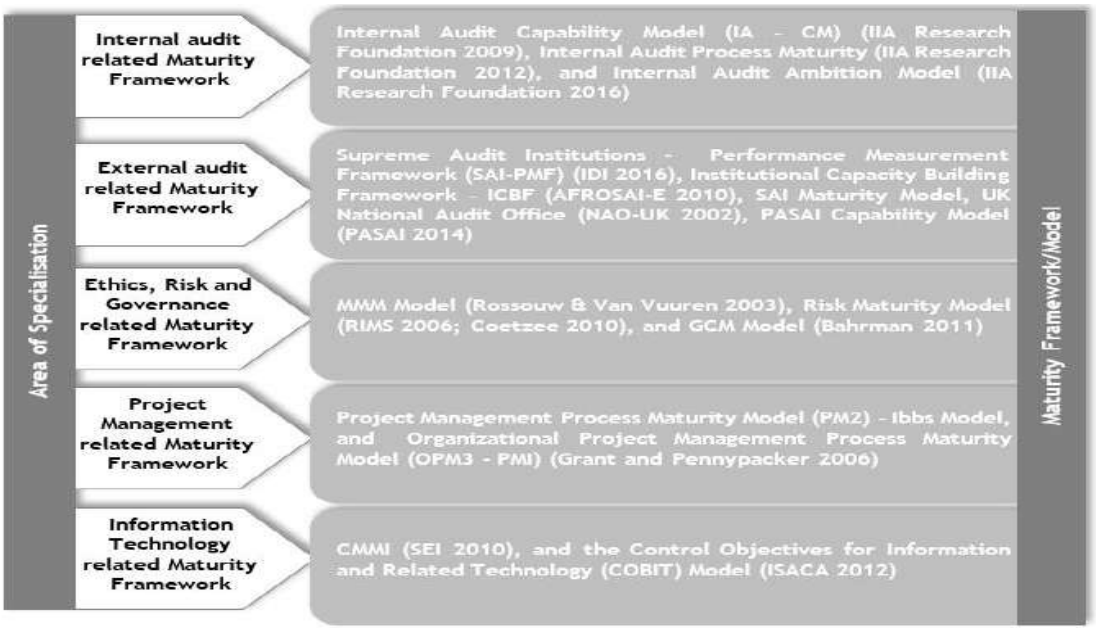
Source: Author's own construction

The development of maturity frameworks involves identifying the objective, defining key components, establishing maturity levels, creating evaluation standards, setting a baseline, developing improvement strategies, and measuring progress over time (Patel, 2016). Developing such frameworks is also a collaborative and iterative process that benefits from contributions by domain experts and stakeholders. The objective is to create a comprehensive, functional, and user-friendly framework for organisations in the selected field (Carvalho et al., 2019). The specific stages can vary according to the framework and organisational context (Carvalho et al., 2019; Ünal et al., 2022).

Overview of Existing Frameworks

Shi and Shi (2023) argue that existing maturity frameworks should be critically reviewed before a new one is developed, because such analysis helps determine whether an existing framework can be adapted to emerging needs. Accordingly, the researchers reviewed 14 organisational maturity frameworks. The review indicated that three frameworks did not address technical auditing and the remaining 11 incorporated it only to a limited extent. Representative maturity-framework studies used in this synthesis include Bagorogoza et al. (2017), Jääskeläinen et al. (2022), Kagoya and Gilbert (2020), Patel (2016), and Wilkinson (2014). The 14 reviewed frameworks and tools are presented in Figure 2.

Figure 2: Analysis of the Existing Governance-Related Maturity Frameworks/ Models



Source: Authors' synthesis of the maturity-framework literature reviewed.

Three main shortcomings that prevent the 14 reviewed frameworks from applying to technical auditing were identified. These shortcomings include the fact that the reviewed maturity frameworks/models for the audits were not developed in accordance with the standards and requirements governing technical auditing. However, the development of these frameworks relies on financial compliance, performance, and internal auditing. Those frameworks have not covered the defined technical competency for technical auditors, work methods, and processes. They have focused on audit types other than technical ones. This has resulted in the absence of continuous improvement components necessary for evaluating the organisational maturity of the technical audit function. The institutional frameworks (i.e., management systems and structures, quality management systems, and organizational and operational strategies) considered in the frameworks used to assess organizational maturity do not apply to technical auditing.

METHODS AND MATERIALS

This study used a mixed-methods design and collected data through document reviews, questionnaires, and interviews. The focus was on variables enabling organisational governance maturity in technical audit functions. Previous studies related to technical auditing and organisational governance maturity were reviewed to develop the theoretical framework. The reviewed documents included national annual audit reports, books, journal articles, and other auditing-related publications. This review gathered information on maturity levels, constructs used in existing frameworks, and criteria for assessing suitability and adequacy. A semi-structured questionnaire with open-ended questions guided the face-to-face interviews. During the interviews, the interviewer explained the concepts of governance maturity, governance structures, systems, and processes to foster a common understanding among participants. Interviewees included technical auditors, audit managers, audit supervisors, quality-assurance officers, and engineers from the seven selected technical audit functions.

The survey used a closed-ended questionnaire with a five-point Likert-type response scale (Baburajan et al., 2020). It covered participation in technical auditing, the purpose of the organisational governance

maturity framework, factors enabling organisational governance maturity of TAFs, and key dimensions of TAFs, including independence and legal framework, organisation and management, human resources and professional development, standards and methodology, and communication and stakeholder management. The Yamane (1967) formula was used to determine the sample size. From a population of 284 technical auditors across the seven TAFs, 128 were selected. Proportional allocation was then used to determine the number of technical auditors selected from each TAF. Respondents were selected because of their direct involvement and experience in technical auditing and organisational governance in public works. They included senior and mid-level managers, technical auditors (operational staff), quality-control reviewers, and quality-assurance reviewers. Respondents were randomly selected within the identified categories.

Exploratory factor analysis was conducted using principal-components extraction and varimax rotation, with a minimum retained factor loading of 0.50, consistent with accepted exploratory factor-analysis practice (Howard & Henderson, 2023). Communalities were also examined to assess the extent to which the retained factors explained item variance. Construct reliability was assessed using Cronbach's alpha and composite reliability (Hair et al., 2019). The framework was then developed from the resulting categorisation, empirical findings, and the literature review.

Several approaches can be used to assess the validity of a model or framework, including evaluation by the development team, independent expert validation, and structured scoring approaches (Balci, 2004; Law, 2022; Sargent, 2013). This study used a focus-group discussion as an independent expert-validation approach to assess the applicability and usefulness of the developed framework (Balci, 2004; Law, 2022; Sargent, 2013). Eleven technical-audit experts were purposively sampled from the seven technical audit functions to participate. At least one expert represented each technical audit function. Comments from the focus group, together with the questionnaire analysis, were used to refine the framework.

RESULTS AND DISCUSSION

Construct Reliability

Construct reliability was evaluated using Cronbach's alpha and composite reliability. A value of approximately 0.70 or higher was treated as an acceptable reference point for internal consistency (Hair et al., 2019; Schober et al., 2021). The analysis found that Cronbach's alpha for each construct exceeded 0.70, and the reported composite reliability values also exceeded 0.70. These results support the internal consistency of the retained constructs. Composite reliability was calculated from the standardised factor loadings as follows:

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + (\sum \varepsilon_i)} \quad (1)$$

Where: λ (lambda) is the standardised factor loading for the item i and ε is the respective error variance for the item i. The error variance (ε) is estimated based on the value of the standardised loading. λ as:

$$\varepsilon_i = 1 - \lambda_i^2 \quad (2)$$

Table 1 presents the results of the factor loadings and construct reliability calculated from the respective factor loadings.

Table 1: Factor Loadings and Construct Reliability Calculated based on Factor Loadings

Items	Factor Loading	Cronbach's Alpha	Composite Reliability (C.R)
ILF		.929	0.929
ILF06	0.732		
ILF04	0.863		
ILF03	0.862		
ILF01	0.773		
ILF02	0.882		
ILF08	0.765		
ILF07	0.771		
QOM_F1		.926	0.925
QOM02	0.76		
QOM03	0.794		
QOM09	0.765		
QOM08	0.806		
QOM06	0.821		
QOM04	0.769		
QOM07	0.78		
QOM01	0.732		
QOM_F2		.929	0.926
QOM16	0.816		

Items	Factor Loading	Cronbach's Alpha	Composite Reliability (C.R)
QOM17	0.848		
QOM14	0.762		
QOM15	0.739		
QOM18	0.87		
QOM13	0.812		
QOM10	0.76		
QOM_F3		.855	0.853
QOM22	0.773		
QOM23	0.757		
QOM24	0.842		
QOM26	0.7		
TAM_F1		.915	0.928
TAM20	0.719		
TAM21	0.74		
TAM18	0.791		
TAM13	0.802		
TAM16	0.829		
TAM03	0.8		
TAM11	0.773		
TAM12	0.83		0.821
TAM_F2		.838	
TAM09	0.708		
TAM14	0.775		
TAM15	0.775		
TAM05	0.663		
HRPD_F1		.918	0.924
HRPD16	0.816		
HRPD13	0.736		
HRPD12	0.76		
HRPD15	0.808		
HRPD11	0.835		
HRPD14	0.776		
HRPD02	0.756		
HRPD10	0.72		
HRPD_F2		.949	0.947
HRPD04	0.789		
HRPD05	0.757		
HRPD07	0.938		
HRPD09	0.901		
HRPD08	0.924		
HRPD06	0.868		
CSM		.888	0.888
CSM02	0.855		
CSM04	0.833		
CSM03	0.792		
CSM05	0.778		

Source: Author's own construction

The summarised findings are shown in Table 2.

Table 2: Measurement of the Internal Consistency between Construct Items

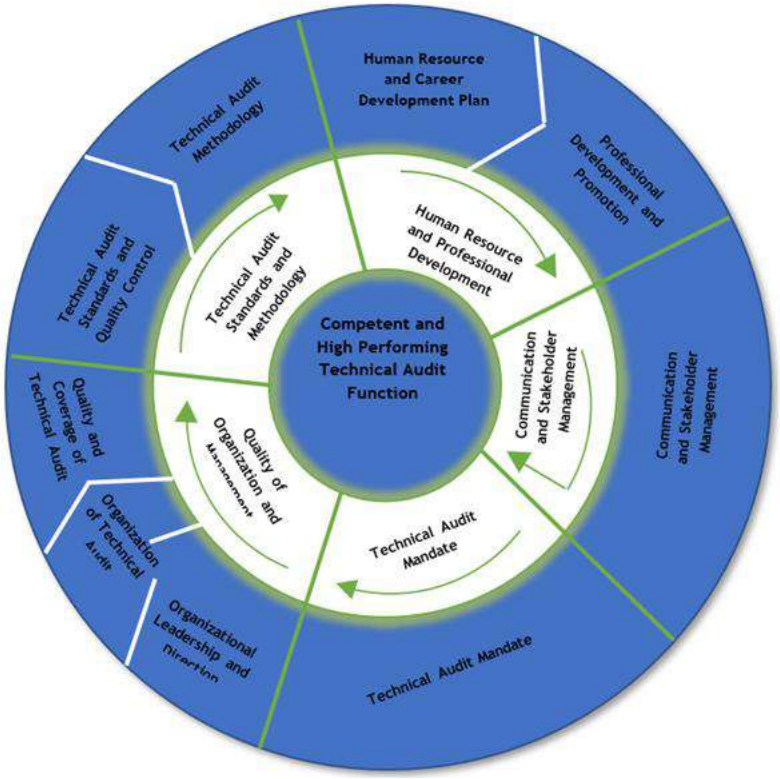
Measured construct/sub-construct	Number of Items	Cronbach's alpha value
Independence and legal framework (ILF)	Seven (7)	0.929
Organisational leadership and direction (QOM – F1)	Eight (8)	0.926
Organisation of the Technical Audit Function (QOM – F2)	Seven (7)	0.929
Quality and coverage of technical audit (QOM – F3)	Four (4)	0.855
Technical audit standards and quality control (TAM – F1)	Eight (8)	0.915
Technical audit methodology (TAM – F2)	Four (4)	0.838
Professional development and promotion (HRDP – F1)	Eight (8)	0.918
Human resources and career development plans (HRDP – F2)	Six (6)	0.949
Communication and stakeholders' management (CSM)	Four (4)	0.888

Source: Author's own construction

Organisational Governance Maturity Framework Development

The maturity framework has been developed based on three main components: identified outcomes, dimensions, and maturity levels used to measure the dimensions. The maturity framework is built from five (5) dimensions and nine sub-dimensions presented in Table 3. The organisational governance maturity framework is illustrated in Figure 3.

Figure 3: Framework for Assessing the Organisational Governance Maturity of a Technical Audit Function (OGM-TAF)



Source: Author's own construction

The detailed linkage between the five (5) main constructs (main dimensions), nine (9) sub-constructs (sub-dimensions), and 55 variables (criteria) is presented in Table 3.

Table 3: Linkage between Construct, Sub-construct, and Variables for the Framework for Assessing Organisational Governance Maturity of the TAF

Construct	Sub-construct	Variables
Independence and Legal Framework (ILF)	Technical Audit Mandate	Independence of Officials from Technical Audit Functions
		Appropriate resources (e.g., human, material, and financial resources)
		Financial independence and autonomy
		Managerial and Administrative (Organisational) autonomy
		Right and obligation to report the results of the technical audit
		Freedom to decide on the scope of the technical audit
Quality of Organisation and Management (QOM)	Organisational Leadership and Direction (QOM – F1)	Multi-year planning for technical audit assignments
		Operational planning
		Existence of a quality assurance function
		Existence of a quality control function
		Code of ethics and professional conduct
		The technical audit function's reporting on its activities and use of resources
		Organisational development
		Strategic planning
	Organisation of the Technical Audit Function (QOM – F2)	Financial management
		Planning and effective use of infrastructure
		Organisational structure
		System of internal control
		Administrative support services

Construct	Sub-construct	Variables
		Time recording system
		Existence of an IT support function
	Quality and coverage of technical audit (QOM – F3)	Quality control of outsourced technical audits
		Quality assurance of outsourced technical audits
		Coverage of technical audits
		Level of implementation of technical audit recommendations
Technical Audit Standards and Methodology (TAM)	Technical Audit Standards and Quality Control (TAM – F1)	Timely publication/reporting of technical audit results
		Follow up on the implementation of technical audit observations and recommendations
		Quality control in technical audit
		Selection criteria for construction projects to undergo a technical audit
		Technical audit standards
		Planning for technical audits
		Implementation of a quality assurance plan
		Defining a mechanism for the documentation of working papers and audit evidence
	Technical Audit Methodology (TAM – F2)	Defining the roles and responsibilities of key players in the technical audit
		The objective of the technical audit
		Scope of technical audit
		Evaluating audit evidence
Human Resource and Professional Development (HRPD)	Professional Development and Promotion (HRDP – F1)	Coaching and mentoring of technical auditors
		Management development
		Professional development for technical auditors
		Attachment to other Technical Audit Functions
		Plans and processes for training technical auditors
		On-the-job training for technical auditors
		Performance management system
		Remuneration, promotion, and staff welfare
	Human Resources and Career Development Plans (HRDP – F2)	Career development plans
		Job rotation
		Human resource function
		Human resources recruitment
		Human resources strategy
		Retaining and exiting strategy
Communication and Stakeholders Management (CSM)	Communication and Stakeholders Management	Good practice regarding internal communication
		Effective information-sharing practices
		Alignment of staff to the technical audit function's vision, mission, goals, and objectives
		Good practice regarding external communication with stakeholders and auditees

Source: Author's own construction

Level of development for different activities

The empirical findings related to the appropriate score levels for a framework for assessing the organisational governance maturity of a technical audit function, which required respondents to specify their score levels for a framework between two given options: a five (5) score level or a six (6) score level. The results show that 61.7% of the respondents see the five (5) score level as the most appropriate score for assessing the organisational governance maturity of a technical audit function. The results of development for different activities are presented in Table 4.

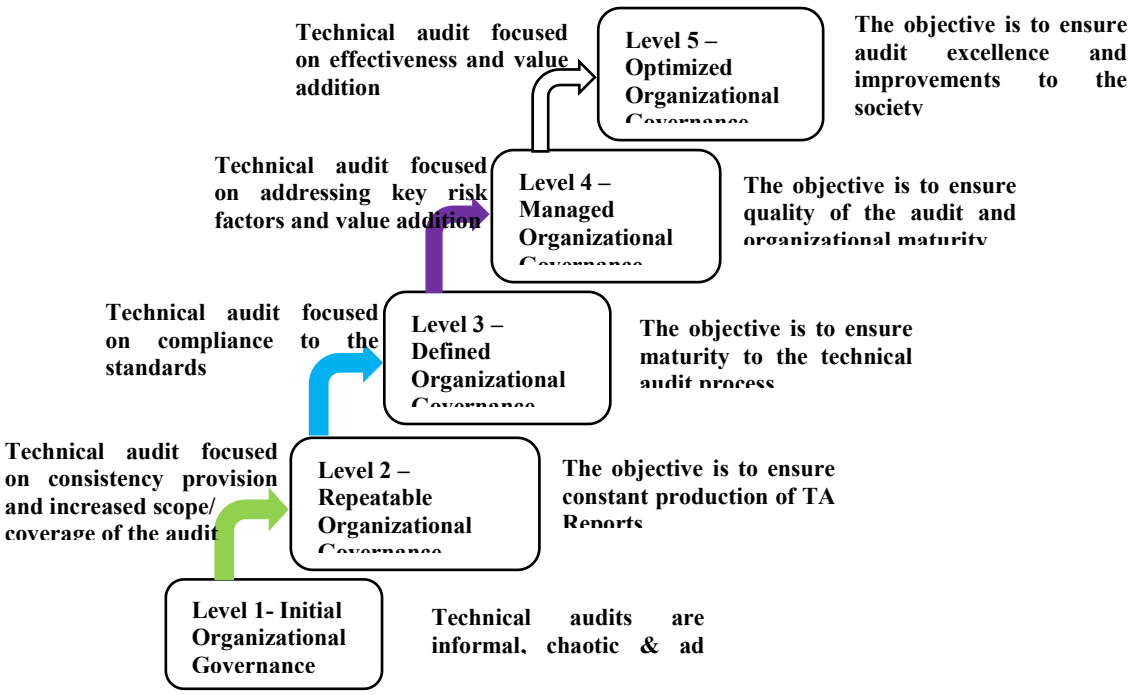
Table 4: Score levels for a framework for assessing organisational maturity of a technical audit function

Level	Frequency	Percent
5 levels	79	61.7
6 levels	39	30.5
Other	10	7.8
Total	**128**	**100**

Source: Author's own construction

Based on the results presented in Table 4, respondents were also asked to describe the most appropriate maturity-level descriptors. The developed framework uses five maturity levels, a staged structure consistent with maturity-model approaches reported in prior studies (Gökalp et al., 2022; Kagoya & Gilbert, 2020). Each level contains process objectives that build progressively on the preceding level. Moving through the levels therefore represents increasing organisational capability to implement an effective governance programme. Figure 4 presents the roadmap from Level 1 to Level 5 of the organisational governance maturity framework.

Figure 4: Maturity Levels in an Organisational Governance Maturity Framework for the Technical Audit Functions



Source: Author's own construction

The Decision for Maturity Level

To determine the level of organisational governance maturity within an organisation, the maturity level of the technical audit function must be calculated. Each dimension of organisational governance maturity needs to be measured based on the state of each dimension in the technical audit function. The steps for determining the overall level of organisational governance maturity of a TAF are presented in Figure 5.

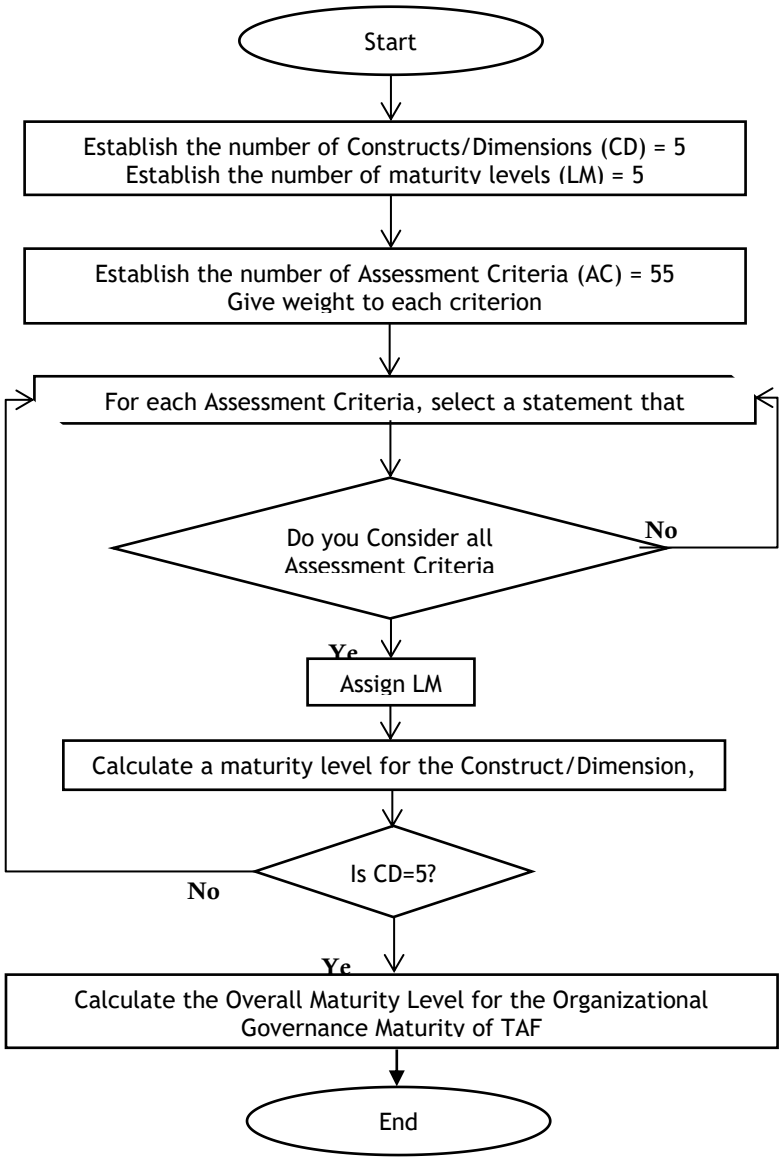


Figure 5: Flowchart for Determining the Maturity Level
Source: Author's own construction

Steps for determining the overall level of organisational governance maturity of a TAF

Step 1: Defining the Core Dimensions/Constructs and Maturity Levels: The five core dimensions or constructs used to assess organisational governance maturity in TAF are defined. The dimensions are mentioned in Table 1 and are coded as "CD." Additionally, the five maturity levels described in Figure 4 are defined in this step. These levels are used to assess these dimensions and are coded as "LM."

Step 2: Defining the sub-dimensions or sub-constructs for all core dimensions: The nine sub-dimensions or sub-constructs used to assess the core dimensions or constructs for organisational governance maturity in the TAF are defined. These sub-dimensions or sub-constructs were described in Table 1 and are coded as "SC."

Step 3: Defining the criteria for all sub-dimensions: The criteria used to assess the individual sub-dimensions or sub-constructs of organisational governance maturity in the TAF are determined. A total of 55 assessment criteria are defined. These assessment criteria and variables are presented in Table 1 and are coded as AC in the proposed formula.

Step 4: Giving weight to each assessment criterion: All defined core dimensions or constructs are assumed to be equally important in this step. Therefore, the maturity level of these core dimensions is determined by their relevant assessment criteria, which are calculated based on the weight assigned to each assessment criterion. Similarly, within each core dimension, a weighted average is assigned to each assessment criterion. Similarly, each core dimension assigns a weighted average to the assessment criteria. The following formula is used to calculate the weight of the assessment criteria.

$$Weight\ of\ the\ Assessment\ Criteria = \frac{1}{ACN} \quad (3)$$

In this formula, ACN is the number of assessment criteria in any dimension.

Step 5: Survey and measure the maturity level for each assessment criterion. All assessment criteria are measured using multiple statements to measure organisational governance maturity.

Step 6: Calculate the maturity level for each assessment criterion. After measuring each assessment criterion of organisational governance, the maturity level for each assessment criterion will be assigned based on the selected statement.

Step 7: Calculate the maturity level for each core dimension. After measuring all assessment criteria for each core dimension, the maturity level for each core dimension will be calculated as the average of the weighted maturity of its assessment criteria. The following formula is used to calculate the maturity level for each dimension of organisational governance:

$$\textit{The Maturity Level} = \frac{\sum_{i=1}^{n} \textit{Maturity Level}\,(i) \times \textit{Weight}\,(i)}{\sum_{i=1}^{n} 5 \times \textit{Weight}\,(i)} \times 5 \qquad (4)$$

Step 8 - Calculate the overall maturity level: After calculating the maturity level for each dimension or construct, the overall maturity level is calculated. The overall maturity level is the average of the weighted maturity levels of all dimensions. The following formula is used to calculate the overall maturity level for the organisational governance in the TAF.

$$\textit{The Overall Maturity Level} = \frac{\sum_{i=1}^{n} \textit{Maturity Level}\,(i)}{N} \qquad (5)$$

Organisational Governance Assessment Matrix Development

This study developed an organisational governance assessment matrix to operationalise the governance-maturity framework presented in Figure 4. The matrix was structured around organisational governance dimensions, maturity levels, and descriptive cell text representing the intersection of each dimension and maturity level. This staged approach is consistent with maturity-framework development practices that progressively specify more advanced organisational capabilities (Carvalho et al., 2019; Gökalp et al., 2022; Ünal et al., 2022). The matrix contains five maturity levels and five core dimensions, with sub-dimensions nested within each dimension. Table 5 provides the detailed organisational governance assessment matrix for the technical audit function.

Table 5: Organisational Governance Maturity Assessment Matrix for TAF

		Constructs				
		Technical Audit Mandate	**Quality of Organisation and Management**	**Technical Audit Standards and Methodology**	**Human Resources and Professional Development**	**Communication and Stakeholders Management**
Maturity Levels	**Level 5 – Optimised Organisational Governance**	Strong financial independence and autonomy on matters regarding technical audit	Organisational leadership and direction, and the quality and coverage of the technical audit, are defined and functioning well.	Technical audit standards and methodologies are in place and functioning well.	Programs for human resources and professional development for technical auditors are in place and well-functioning	The existence of good practices regarding internal and external communication with stakeholders and auditees
	Level 4 – Managed Organisational Governance	Good financial independence and autonomy on matters regarding technical audit	Organisational leadership and direction, and the quality and coverage of the technical audit, are	Technical audit standards and methodologies are in place and, to some extent, functioning well.	Programs for human resources and professional development for technical auditors are in place, but	There is an existence of good practices regarding internal and external communication with stakeholders

		Constructs				
		Technical Audit Mandate	**Quality of Organisation and Management**	**Technical Audit Standards and Methodology**	**Human Resources and Professional Development**	**Communication and Stakeholders Management**
			defined and, to some extent, are functioning well.		are not adhered to to a large extent.	and auditees, but they are not fully implemented.
	Level 3 – Defined Organisational Governance	Lack of financial independence and autonomy in matters related to technical audits. However, considerations are taken into account in a budgetary manner.	Organisational leadership and direction, and the quality and coverage of the technical audit, are defined, but they are not functioning well.	Technical audit standards and methodologies are in place, but they are not functioning well.	Programs for human resources and professional development for technical auditors are in place, but adherence is not always strict.	Some good practices regarding internal and external communication with stakeholders and audited entities are in place, but they are not functioning properly.
	Level 2 - Repeatable Organisational Governance	Weak financial independence and autonomy on matters regarding technical audit	Organisational leadership and direction, and the quality and coverage of the technical audit, are somewhat defined, but are in their infancy.	Technical audit standards and methodologies are in place, but they are in the early stages of development.	Programs for human resources and professional development for technical auditors are in place, but are not adhered to	Some good practices regarding internal and external communication with stakeholders and auditees have not been implemented.
	Level 1 – Initial Organisational Governance	No financial independence and autonomy on matters regarding technical audit	Organisational leadership and direction, and the quality and coverage of the technical audit, are not defined.	Technical audit standards and methodologies are not in place	Programs for human resources and professional development for technical auditors are not in place	Lack of good practice regarding internal and external communication with stakeholders and auditees

Source: Author's own construction

Validation and Evaluation af the OGM Framework

Framework validation assesses whether a framework and its outputs are sufficiently credible and appropriate for their intended use (Balci, 2004; Law, 2022; Sargent, 2013). In this study, validation was undertaken before final use of the framework. An independent expert-validation approach was applied through a focus-group discussion involving technical-audit experts and practitioners (Law, 2022; Sargent, 2013).

This study used focus group discussions to validate the framework and its assessment matrix. The focus group recommended improvements in the OGM framework. It comprised 11 participants from seven technical audit functions in Tanzania, identified as TA1 - TA11. These included two procurement specialists, two quantity surveyors, one architect, and six engineers. The demographic details of the participants are presented in Table 6.

Table 6: Characteristics of Focus Group Participants

Participant Group	Code	Entity	Profession	Role in the Technical Audit	Experience with the Entity	Experience in the Technical Audit	Experience in Governance
Audit Office	TA1	NAOT	Procurement Specialist	Technical Auditor	More than 10 years	More than 10 years	More than 10 years
	TA2	IAG	QS	Technical Auditor	5 – 10 years	5 – 10 years	5 – 10 years
	TA3	Independent	Engineer	Technical Auditor	More than 10 years	More than 10 years	More than 10 years
	TA4	NAOT	Engineer	Quality Control Reviewer	More than 10 years	More than 10 years	More than 10 years
	TA5	IAG	Engineer	Quality Assurance Reviewer	More than 10 years	More than 10 years	More than 10 years
	TA6	RFB	Engineer	Quality Control Reviewer	More than 10 years	More than 10 years	More than 10 years
	TA7	NCC	Engineer	Quality Assurance Reviewer	5 – 10 years	5 – 10 years	5 – 10 years
Regulatory Board	TA8	ERB	Engineer	Technical Auditor	More than 10 years	More than 10 years	More than 10 years
	TA9	PPRA	Procurement Specialist	Quality Control Reviewer	5 – 10 years	5 – 10 years	5 – 10 years
	TA10	Independent	QS	Technical Auditor	5 – 10 years	5 – 10 years	5 – 10 years
	TA11	AQRB	Architect	Technical Auditor	More than 10 years	More than 10 years	5 – 10 years

Source: Author's own construction

Therefore, to validate the adequacy and usefulness of the OGM framework, the focus group had several objectives. It was responsible for:

a) bringing together key experts in the field of technical auditing from seven technical audit functions in Tanzania to discuss and deliberate on the suitability and usefulness of the proposed OGM framework and its assessment matrix;
b) analysing the validation criteria to assess the proposed OGM framework and its assessment matrix based on the already prepared questionnaire. These criteria include completeness, relevance, consistency, objectivity, usefulness, verifiability, practicality, compliance, progressiveness, quality assurance, brevity, and performance improvements. Each criterion contains a sub-criterion and
c) receiving comments and suggestions for improvements from the participants (practitioners of the technical audit) to improve the proposed OGM framework and its assessment matrix.

Results of the Validation of the Framework

The analysis of the overall summary for validating the framework and its assessment matrix was conducted using the 12 validation criteria, with all criteria having mean scores ranging from 4 to 5, as demonstrated in Table 7.

Table 7: Validation Results of the OGM Framework for each Criterion

Criterion	Sub-criterion	Maximum score	Mean score per sub-criterion	Mean score per criterion
Completeness of the OGM Framework	Scope of organisational maturity	5	4.82	4.77
	Dimensions of the framework	5	4.82	
	Defined dimensions in the framework	5	4.73	
	Maturity levels have the correct name	5	4.73	
	Completeness and recognisable	5	4.73	

Relevance of the OGM Framework	Identify strengths and weaknesses	5	4.82	4.78
	Provide a benchmark	5	4.82	
	Set realistic goals for improvements	5	4.73	
	Encourage continuous improvement	5	4.73	
Consistency of the OGM Framework	Defined and measurable criteria	5	4.82	4.71
	Methods are standardised	5	4.64	
	Methods used consistently	5	4.73	
	Framework reviewed regularly	5	4.82	
	Consistent and clear communication	5	4.64	
	Clear guidance and instructions	5	4.73	
Objectivity of the OGM Framework	Clear and well-defined criteria	5	5.00	4.75
	Consistent criteria across all levels of maturity	5	4.73	
	Framework is transparent	5	4.73	
	Framework validation	5	4.55	
Usefulness of the OGM Framework	Helpful in improving the governance processes	5	4.82	4.82
	Beneficial to decision-makers	5	4.82	
Verifiability of the OGM Framework	Meets its development objectives	5	4.91	4.73
	Produce a consistent results pattern	5	4.64	
	The process can be verifiable	5	4.64	
Practicality of the OGM Framework	Easy to use	5	5.00	4.78
	Easy to learn	5	4.91	
	Simple to understand	5	4.73	
	Provide utility to the organisation	5	4.64	
	Flexible, tailorable, and adaptable	5	4.64	
Compliance of the OGM Framework	Clear guidelines and standards	5	4.82	4.82
	Facilitate compliance monitoring mechanisms	5	4.82	
Progressiveness of the OGM Framework	Practical and meets the needs	5	5.00	4.82
	Measure the impact through KPIs	5	4.64	
	Benchmark its maturity levels	5	4.82	
Quality assurance of the OGM Framework	Development of a quality plan	5	4.73	4.73
	Standardised assessment methods	5	4.73	
	Assessment Tool can be evaluated	5	4.73	
Brevity of the OGM Framework	Concise and succinct	5	5.00	4.91
	Easily understood	5	4.91	
	Sufficient level of detail	5	4.82	
Performance improvements of the OGM Framework	Clear and measurable criteria	5	4.91	4.87
	Consistent methods	5	4.64	
	Integrated with other processes	5	4.91	
	Flexible to changing needs	5	4.64	

Source: Author's own construction

The overall analysis of the feedback and responses from the focus group on the proposed OGM framework and its assessment matrix indicates that the group was very optimistic about it. The proposed OGM met all 12 validation criteria and acknowledged that the framework has been developed in compliance with the standards and relevant requirements in the field of technical auditing.

Conclusion and Implication

This study aimed to develop a framework to assess organisational governance maturity for technical audits of public works within public sector organisations in Tanzania, the first such attempt to encompass both organisational governance and technical auditing aspects. The study offers a comprehensive and practical tool for assessing the organisational governance maturity of a TAF in the context of technical audits for public works in Tanzania. This tool incorporates established criteria and factors, providing a systematic framework for evaluating and enhancing governance practices specific to the technical audit domain. The framework was developed based on five (5) domains (constructs) of technical auditing and five (5) maturity levels. The maturity levels range from 1 to 5, where level 1 indicates a TAF that lacks most of the requirements and is termed "lacking the maturity", while level 5 indicates a TAF that meets most of the criteria and is termed "fully matured."

For the TAF to move from one maturity level to another, it needs to use the framework to guide its assessment by understanding where it stands, its areas of strength and weakness, and then identifying concrete steps to address them. For effective implementation of the framework, a TAF can take the following six steps: (a) employ the assessment methods, such as surveys, interviews, and document reviews, produced inside the framework to gather data on technical auditing practices; (b) analyse the current technical audit documentation, reports, and processes to comprehensively understand the current practices and pinpoint areas that can be improved; (c) utilise predetermined criteria and key performance indicators (KPIs) to allocate scores to each component of technical auditing, as well as ensure the scoring is uniform and accurately reflects the organisation's performance; (d) generate a thorough evaluation report encompassing in-depth observations, ratings, and suggestions (The report should be clear and capable of being acted upon and readily available to stakeholders.); (e) assess the organisation's technical auditing maturity to industry standards or best practices; and (f) identify and emphasise key areas that necessitate prompt attention and improvements, as determined by the evaluation findings.

Its implementation can improve governance effectiveness and accountability within public works projects. The technical audit functions and practitioners in the field of technical audit and public works may provide comprehensive training on using the developed tool for technical auditors and relevant stakeholders involved in public works projects, integrate the tool into existing technical audit processes and workflows to ensure seamless adoption, and periodically review and update the tool to reflect changes in public works practices, regulations, and governance standards. Moreover, it is recommended to extend the study to other continents or countries, as the present study focused mainly on Tanzania, particularly the public sector, to provide cross-country validation of the OGM framework for TAF. This will reveal knowledge from other countries that have different institutional settings. Finally, it is recommended that comparative institutional studies be conducted and tested across technical audit functions in the country.

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