

Review

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Review

Antecedents, Decisions, and Outcomes for ICT Governance Adoption in the African Public Sector: A Systematic Review Based on McClelland Theory and ADO Framework

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Abstract

Digital systems now serve as the foundation of institutional planning and service delivery. The public sector operates under various influential factors that complicate its ability to fulfil its mandates effectively. It is therefore important for these entities to adopt ICT governance to integrate ICT into business operations for effectiveness. This review identifies antecedents, decisions and outcomes that influence ICT governance and maps them to McClelland's theory of Needs. It also analyses the geographical and publication trends influencing ICT governance adoption in the African public sector. A systematic review was conducted using the SPAR-4-SLR protocol and the ADO framework. Peer-reviewed publications and grey literature from 2010 to 2025 were retrieved from Scopus and Web of Science. The selected studies were coded and thematically analysed. The study's findings were categorised into structural, relational, and process pillars. The main finding suggests that relational mechanisms must be addressed for effective ICT governance. The findings, when mapped into McClelland's framework, indicate that power needs to affect control processes, achievement needs to impact performance processes, and affiliation to provide the necessary conditions for effective ICT governance. It is imperative that leaders consider the factors to avoid symbolic representation of ICT governance in public sector.

Keywords: ICT governance; antecedents; decisions; outcomes; African public sector; adoption; McClelland's theory of needs

1. Introduction

In today's digital era, organisations across both private and public sectors depend heavily on Information Technology solutions to achieve organisational objectives. They continue to allocate substantial investments in producing products that strategise, coordinate, and improve public service delivery, to ensure efficiency and cost-effectiveness for citizens [1,2]. The private sector consists of profit and non-profit organisations such as mutual organisations and NGOs. In contrast, the public sector comprises semi-government bodies and government units, mainly funded by government allocations and delivering services on behalf of the government [3,4]. The public sector operates under numerous influencing variables, including legal and political constraints, limited IT investment, ethical service requirements, accountability, political cycles, conflicting goals, stakeholder interests, organisational culture and strategy, maturity, technical and cultural issues, and multiple stakeholders. These factors complicate governance and make it difficult for organisations to fulfil their mandates effectively [3–5]. Therefore, a combination of these experiences and intricate ICT environments encourages organisations to adopt ICT governance and management practices to integrate IT into business operations, since this combination is vital to the economic and social life of

communities. ICT technology governance involves creating a framework that outlines accountability and decision-making authority, aiming to encourage desired behaviour in the use of IT [6].

Globally, the public sector benefits from ICT governance adoption in many ways: improved alignment between IT and business, efficient use of IT resources and assets responsibly, better communication among stakeholders, enhanced customer service and overall responsiveness, stronger risk management, improved decision-making for institutional direction and IT policy and strategy development, increased performance and regulatory compliance, clearer accountability and decision rights, better cost control and efficiency, fewer system failures, and an improved range of activities with higher quality administration and services [7,8]. The African public sector is losing these advantages by failing to consistently implement ICT governance. Evidence of ICT governance maturity in South Africa, which could provide insight into the broader public sector across Africa, shows a deficiency, as institutions report low project maturity, inadequate ICT governance processed and outdated national guidance [9]. As a result, ICT investments will be insufficiently governed to deliver sustained public value due to the absence of national frameworks, board oversight, accountability, and stronger leadership, leading to fragmented and ineffective ICT governance in the African public [10]. It is therefore crucial that Africa leapfrog in adopting ICT governance practices that meet global standards, thereby enhancing service delivery and accountability to citizens.

Numerous global studies have examined the factors influencing the adoption of ICT governance in the public sector. To further understand these factors, it is useful to group them by antecedents, decisions, and outcomes. Antecedents drive engagement, while decisions indicate behavioural performance categories and structure, and outcomes reflect the results of engagement or non-engagement [11]. The literature has classified effective ICT governance into three pillars or mechanisms: structural, process, and relational and all the identified factors fall under these mechanisms [12]. The literature further categorises antecedents into enablers and barriers. The structural enabler mechanisms include formal systems of governance that address accountability or authority, and may include leadership support, organisational structure and design, and structures such as the steering committee, CIO's membership of the executive management team, role definition of structures, and the setting up of a project governance office. Regarding structural barriers, factors include an overpowered IT management, confusion over the CIO/CTO role, inadequate reporting and accountability structures, organisational politics, ineffective IT steering committees, a lack of IT experts in decision-making positions, absence of IT strategies, policies, or regulatory support, fragmented IT initiatives, imbalances in IT budgeting, limited financial, human, and technological resources, differing organisational priorities, and organisational or technical immaturity. Process enablers are mechanisms that facilitate or control ICT activities. Enabler factors include strategic information systems planning, IT demand management, governance frameworks and policies, service-level agreements, project monitoring systems, and performance measurement tools. Process-based barriers factors include complex, inefficient, poor, or absent ICT governance processes, lack of standardization, weak enforcement of IT governance practices, inadequate financial planning such as missing economic evaluation or inefficient budgeting, poor performance measurement, ineffective communication of IT plans, subpar project management practices, inadequate data protection or security management, weak IT operational management and low maturity in incident management or business-IT integration processes. Relational enabler mechanisms focus on people and cooperation that influence the adoption of ICT governance. It includes organisational culture, ethics, ICT skills and training, communication, mutual understanding between business and IT stakeholders, and dealing with external parties such as consultants and vendors [13–17]. Relational barriers factors include a lack of strong leadership commitment, ineffective communication or strategic planning, viewing IT simply as a service function, insufficient support from vendors or the organisation, absence of professional communities for ICT governance, poor change management or feedback mechanisms, dependence on traditional communication methods, high staff turnover, limited IT skills, and weak business ownership of IT initiatives [2,8,18–22]. Structural decisions influencing ICT governance adoption include senior management's commitment, decision rights and responsibilities

related to IT, and structures such as the CIO position and committees. Meanwhile, process decisions involve aligning IT with the organisation's strategy, managing risks, prioritising and budgeting IT resources, and designing performance metrics and policies. Relational decisions focus on communication, knowledge sharing, and stakeholder engagement [4,23,24].

In terms of outcomes, ICT governance facilitates the development of shared information technology infrastructure and whole-of-government approaches, which, in turn, enhance coordination between public sector organisations and link IT investments to their priorities. Process-related outcomes include fostering accountability and transparency in resource use, monitoring public finances, ensuring IT projects remain within budget, encouraging responsible management of resources and assets, enabling informed decision-making in the public sector, and reducing IT project failures and increasing returns on ICT investments. Relational outcomes encompass effective communication between IT and business units, collaboration among agencies, proactive risk and change management, and greater public participation, while enhancing the efficiency of the public service delivery sector [3,8,19,23]. Therefore, effective ICT governance is a situation in which these three dimensions are connected, where antecedents influence decisions, and where these decisions, in turn, influence outcomes, thus linking IT with organisational goals. [3,12,25]. [26] summarised key effective ICT governance practices, as illustrated in Figure 1 below.

IT Governance Mechanisms		
Structural mechanisms 1. Formal definition and integration of governance/alignment task in roles responsibilities 2 IT Architecture steering committee 3 Business/IT relationship managers 4 CIO on Board 5 CIO on executive committee (CIO reporting to CEO and/or COO) 6 E-Business advisory board 7 IT audit committee at level of board of directors 8 IT councils 9 IT expertise at level of board directors 10 IT investment committee or capital improvement 11 IT leadership councils 12 IT organization structure 13 IT project steering committee (IT project feasibility) 14 IT strategy committee 15 IT steering committee 16 ITG function/officer 17 Security/compliance/risk officer	Process Mechanism 1. Benefit and management reporting 2 Chargeback 3 Demand management 4 ITG frameworks (COBIT, ITIL, TOGAF, etc.) 5 ITG assurance and self-assessment 6 IT budget control and reporting 7 ITG maturity models 8 IT performance measurement (IT Balanced Scorecard) 9 IT investment and portfolio management (Business Case, Information Economics, etc) 10 IT project governance management methodologies 11 Project tracking 12 Service level agreement 13. Strategic information system planning	Relational Mechanism 1. Business/IT account management 2 Business/IT collocation 3 Organization communication system (internal communication addressing on regular basis) 4 IT leadership (top management support & involvement in IT initiatives agenda) 5 Cross-functional business/IT job rotation 6 Cross-functional business/IT training 7 Executive/senior management give the good example 8 Informal meeting between business & IT executive/senior management 9 ITG awareness campaigns 10 Office of CIO or ITG 11 Partnership rewards and incentives 12 Senior management announcements 13 Shared understanding of business/IT objectives

Figure 1. IT Governance mechanisms (Adapted from: [26]).

Previous systematic reviews mainly synthesised the ICT governance literature and identified various organisational factors, human dimensions, and governance mechanisms that influence adoption. These are largely generic and globally oriented, with limited focus on the public sector in developing nations, including Africa [27–29]. However, existing reviews do not explicitly organise the literature on integrating determinants of ICT governance adoption into antecedents, decisions, and outcomes affecting the public sector both in Africa and globally, leaving the causal relationships between these elements insufficiently synthesised. The ADO framework divides the study into three main components to thoroughly analyse ICT governance adoption. Furthermore, to the best of our knowledge, neither global nor African reviews have provided a theoretical explanation of ICT governance adoption using McClelland’s motivational theory. Thus, it is imperative to conduct a

systematic review of ICT governance adoption in the African public sector, using ADO and McClelland’s motivational theory to consolidate fragmented research in this field. In this regard, this study aims to systematically examine available literature on ICT governance in the African public sector and interpret it using McClelland’s Theory of Needs. The following research questions guide this research.

1. What are the antecedents, decisions, and outcomes that influence ICT governance adoption in Africa?
2. What are the geographical and publication trends that influence ICT governance adoption in Africa?
3. How can ADO findings be mapped to McClelland's motivational theory?

The paper is structured as follows: methodology, which outlines the review protocol; results presentation; discussion, which interprets the findings and contributions; and conclusion, which summarises the research.

2. Materials and Methods

For this systematic literature review, a domain-based methodology focusing on ICT Governance adoption in Africa’s public sector was employed, alongside a robust framework-based methodology as suggested by [30]. The review utilises the SPAR-4-SLR protocol and the ADO framework to synthesise ICT governance mechanisms, institutions, and outcomes. Antecedents are factors that influence engagement, decisions cover behavioural performance categories and structures, while outcomes pertain to the results of engagement or non-engagement [11]

Review protocol

This systematic literature review utilises the three-stage SPAR-4-SLR protocol developed by [31] to collect and analyse the research corpus. Although the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement is well recognised for promoting transparency in systematic reviews, its development was primarily geared towards medicine and the health sciences [32]. In this study, the SPAR-4-SLR protocol is used. The protocol is suitable for research in information systems, business, and management. The SPAR-4-SLR protocol not only includes reporting but also provides guidelines and justifications for scientific procedures. The present study aims to identify the domain of ICT governance using the ADO framework and McClelland’s theory, thereby highlighting the importance of the SPAR-4-SLR protocol. SPAR-4-SLR goes through three phases: assembling, arranging, and assessing. Assembling involves finding and sourcing relevant literature. Arranging refers to refining and organising these studies through systematic screening. Assessing consists of analysing the chosen literature and presenting the results clearly. Figure 2 outlines the SPAR-4-SLR process and the inclusion and exclusion criteria used in the current study. These criteria define the scope and boundaries of the research, as well as the reasons for excluding the articles.

Assembling

Assembling refers to the process of identifying and gathering relevant literature for the review. Identification involves research questions, domain, source quality, and source type, while acquisition pertains to material, search method, period, and keywords. The literature sources include peer-reviewed articles, conference papers, government publications, dissertations, and book chapters that specifically focus on ICT Governance in Africa’s public sector. Two major databases, Scopus (135 records) and Web of Science (59 records), totalling 194 records, were used for the quality dimension and were searched between October 2025 and December 2025. Appendix A.1 offers a detailed breakdown of each database for the articles retained after screening. The literature covers 2010-2025, including both early contributions and new developments, as shown in Table 1. The search was confined to ICT governance, factors, and the public sector, ensuring contextual alignment.

Table 1. Search string.

Search term composition

ICT Governance		Enablers		African Public Sector
IT Governance		Barriers		African municipality
Information Technology		Antecedents		African public department
Governance	AND	Factors	AND	
Governance of IT				
(TITLE-ABS-KEY ("ICT Governance" OR "IT Governance" OR "Information Technology Governance" OR "Corporate Governance of IT") AND TITLE-ABS-KEY ("African public sector" OR " African State-Owned Enterprises" OR "Sub-Saharan Africa" OR " African public institution*")) AND TITLE-ABS-KEY (enabler* OR barrier* OR determinant* OR factor* OR challenge* OR obstacle* OR constraint* OR inhibitor*))				
(TS= ("ICT Governance" OR "IT Governance" OR "Governance of IT" OR "Corporate Governance of ICT" OR "Information Technology Governance" OR "ICT Governance adoption") AND TS= (public sector OR public institutions OR government) AND TS= (enablers OR barriers OR factors OR challenges OR "factors influencing"))				

Arranging

The second phase of SPAR-4-SLR is arranging, which involves organising collected literature using systematic literature coding. Arranging is divided into organisation and purification. The organisation phase involves coding literature in accordance with the ADO framework and providing bibliometric information [30] The ADO framework has three dimensions: Antecedents (enablers and barriers), Decisions (frameworks, mechanisms, and implementation), and Outcomes (performance, alignment, and transparency). Bibliometric data includes authors, types, countries, and keywords. To offer a comprehensive view of ICT Governance in Africa’s public sector, the study includes book chapters, government publications, dissertations, and conference articles. Additionally, grey literature is incorporated to minimise bias [33]. In this review, grey literature includes government publications and dissertations. The purification stage includes an extensive screening process that ensures quality and consistency, including the elimination of duplicate data (n = 11), irrelevant literature from the private sector or outside Africa, and data that lacked adequate emphasis on ICT governance (n = 140). The literature review comprised 33 publications and 7 grey literature sources, totalling 40, which aligns with the recommended 40 articles for domain maturity [34].

Assessing

The assessment stage marks the last phase of the SPAR-4-SLR process and covers the full scope of evaluation and reporting. Here, the synthesised knowledge is evaluated and presented. Content analysis, guided by the ADO framework, was applied to the articles, thereby improving the systematic and organised nature of the literature review by structuring and interpreting specific units of analysis [35,36]. This method facilitated the identification of conceptual relationships and research contexts within the reviewed studies. The research agenda identified gaps that can guide future research. For reporting, figures, SPAR-4-SLR flow diagrams, and tables (Tables 2–5), this research draws on guidance. The study is fully reproducible due to the implementation of batch-level audit trials. Feedback from peer reviewers provided valuable support during manuscript development.

Table 2. Distribution of publications.

Publication Type	Counts
Journal Articles	15
Conference Papers	16
Book Chapters	2
Dissertation	2
Government Publications and Reports	5
Total	40

Table 3. Enablers to ICT governance adoption.

Theme	Total Counts	Codes	Key References
A- Process Based Enablers (PBE)			
PBE1: ICT Governance Framework and Standards Adoption	6	Framework Alignment Recognised Frameworks Policy Frameworks and Legislative Mandates	[37–42]
PBE2: Business–ICT Governance Alignment	5	Strategic Alignment Viable Systems Model Synergy Tool-set Usability and Access	[38,43–45]
PBE3: ICT Governance Implementation Capability	5	Phased Implementation Operational Efficiency Business Case Utilisation	[44,46–49]
PBE4: IT Risk, Control and Assurance Mechanisms	4	Risk Management Continuous Auditing Performance Assessment Tools External Compliance	[42,49–51]
B- Structural Based Enablers (SBE)			
SBE1: Formal ICT Governance Structures and Decision Rights	4	Governance Committees and Oversight Bodies Committees and Councils Governance Structures Board Oversight	[24,41,52,53]
SEB2: Executive ICT Governance Roles and Competence (CIO/Board)	2	CIO Influence (Structural Role) Board Competencies	[45,52]

SBE3: Enterprise Architecture and Human Capital for ICT Governance	5	Simplified Architecture and Charters Human Capital Investment Political Mandate Corporate Governance	[5,39,47,54,55]
C: Relational Mechanisms Enablers (RME)			
RME1: Executive and Political Sponsorship of ICT Governance	10	Executive / Top Management Support IT Leadership Political Leadership Strategic Leadership	[9,24,39,42,45,50,54,56–58]
RME2: Stakeholder Engagement and Collaboration for ICT Governance	3	Stakeholder Communication Resource Collaboration Council Empowerment	_[58–60]
RME3: ICT Governance Culture, Ethics and Organisational Learning	3	Common Identity Ethical Leadership Absorptive Capacity	[5,55,59]
RME4: Mandates and Accountability Pressures for ICT Governance Adoption	3	External Mandates External Pressures Internal Organisational Imperatives	[49,52,61]

Table 4. Barriers to ICT governance adoption.

Theme	Total Counts	Codes	Key References
A- Process Based Barriers (PRB)			
PRB1: ICT Governance Framework/Policy Complexity and Gaps	4	Framework Complexity Legislative Gaps Holistic Gaps	[38,46,47,62]

PRB2: Low ICT Governance Maturity and Weak Strategic Alignment	4	Low Maturity Levels Ad-Hoc Decision Making Financial Constraints	[5,36,43,62] [43,45,48]
PRB3: ICT Governance Funding Constraints and Weak Process Accountability	3	Weak Accountability	

Structural Mechanisms Barriers (SMB)

SMB1: ICT Governance Resource and Capacity Deficits	5	Resource Scarcity Human Resource Shortage Institutional Weakness	[24,39,46,47,54,58]
SMB2: Bureaucratic Structures and Misaligned ICT Governance Architecture	6	Decision Complexity Bureaucracy Weak Reporting Lines Structural Isolation Ad Hoc Management	[39,40,56,60,63,64]
SMB3: Leadership Turnover Disrupting ICT Governance Continuity	1	Leadership Instability	[65]

C: Relational Mechanism Barriers (RMB)

RMB1: Limited ICT Governance Awareness, Skills and Board Competence	10	Knowledge Gaps Skill Deficits Board Competence Myth of compliance	[24,38–40,43,52,53,65–67]
RMB2: Resistance to ICT Governance and Unethical/Corrupt Cultures	3	Organizational Resistance Cultural Resistance	[61,65,68]

RMB3: Weak Stakeholder Communication and Siloed Governance	4	Dysfunctional Culture Corruption Relational deficits Communication gaps Siloed operations Conflicting expectations	[42,52,54,69]
RMB4: Political Interference and Low Strategic Buy-in for ICT Governance	1	Political Interference	[42,49–51,59,60]

Table 5. Decisions influencing ICT governance adoption.

Theme	Total Counts	Codes	Key References
A- Process Based Decisions (PRD)			
PBD1: Decision to Adopt and Standardise ICT Governance Frameworks	7	Adopting Frameworks Framework Selection Contextual Customization Digital Transformation Value Creation	[5,37,39,43,62,68,70]
PBD2: Decision to Align ICT Governance with Strategy and Public Value	5	Strategic Goal Support Strategic Priorities Strategic Alignment Resource Integration Resource Allocation and Prioritisation	[37,40,46,55,56] [24,39,41,58,60,71]
PBD3: Decision on ICT Governance Resourcing, Budget and Risk Appetite	6	Budgetary Control Risk Management and Control Sourcing Strategy	1]
PBD4: Decision on ICT GOVERNANCE Implementation Approach and Process Discipline	5	Phased Approach Process Formality Rulemaking and Implementation	[53,61,67,70,72]
B-Structural Mechanisms Decisions (SMD)			
SMD1: Decision on ICT Governance Roles and Accountability	4	Structural Formalization Governance Structure Roles Decision Rights Structure Creation	[41,42,57,68]

SMD2: Decision to Establish ICT Governance Committees and Oversight	5	Stakeholder Collaboration Committee Formation Oversight delegation Investment Approval and Selection	[39,42–44,66]
SMD3: Decision on ICT Governance Authority Model and Policy Institutionalisation	7	Locus of Authority Archetype Definition Charter Establishment Policy Institutionalisation and Directives In-house Capacity and Team Reconfiguration	[39,47,48,50,54,59,63]
RMB2: Resistance to ICT Governance and Unethical/Corrupt Cultures	3	Charter Establishment Policy Institutionalisation and Directives	[61,65,68]
C- Relational Mechanism Decisions (RMD)			
RMD1: Decision to Share ICT Governance Accountability and Coordinate Across Stakeholders	1	Accountability Sharing Goal Redefinition	[68]
RMD2: Decision to Build ICT Governance Agility and Responsiveness	1	Agility	[55]
RMD3: Decision to Elevate ICT Governance to Strategic Oversight and Manage Suppliers	3	Strategic oversight De-politicisation Supplier management	[5,44,58]

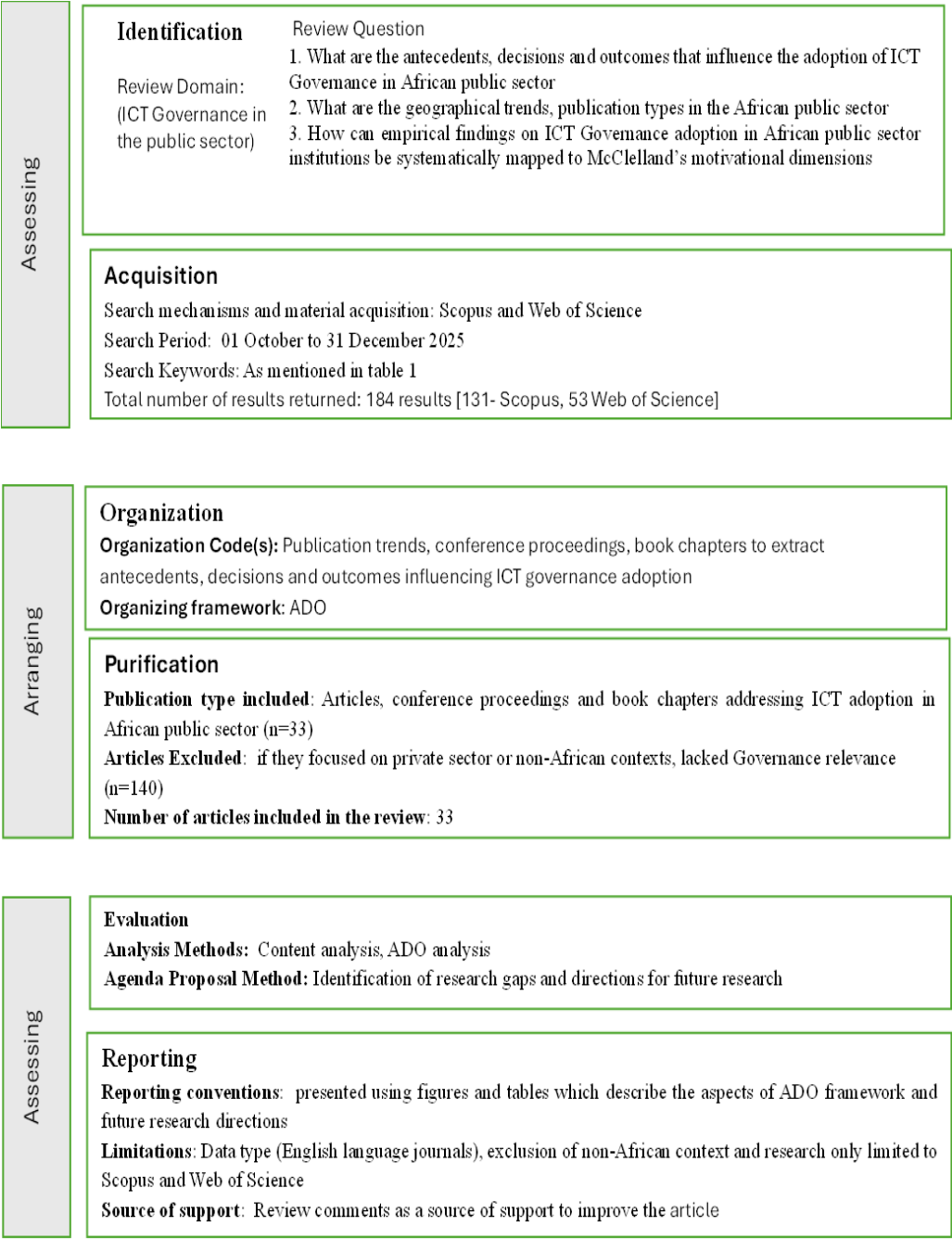


Figure 2. Flow diagram of article selection using SPAR-4-SLR protocol.

3. Results

This section displays the analysis results, divhided into two parts: a descriptive analysis of the publications included in the review and a content analysis of the synthesis findings.

3.1. Descriptive Overview

The descriptive section provides a detailed analysis of publication trends and scholarly contributions within the field of ICT Governance in African public sector

3.1.1. Publication Trends

The publication trend analysis concentrates on conference papers, journal articles, and book chapters, excluding grey literature. Figure 3 illustrates the count of ICT Governance publications in the African public sector from 2010 to 2025. The publication numbers increased steadily, with a

notable rise beginning in 2016. The peak was in 2023, with 7 publications, followed by 2024, with 5, and 2015, 2018, and 2019, each with 4 publications. Conversely, the initial years, 2010 and 2011, each had 2 publications

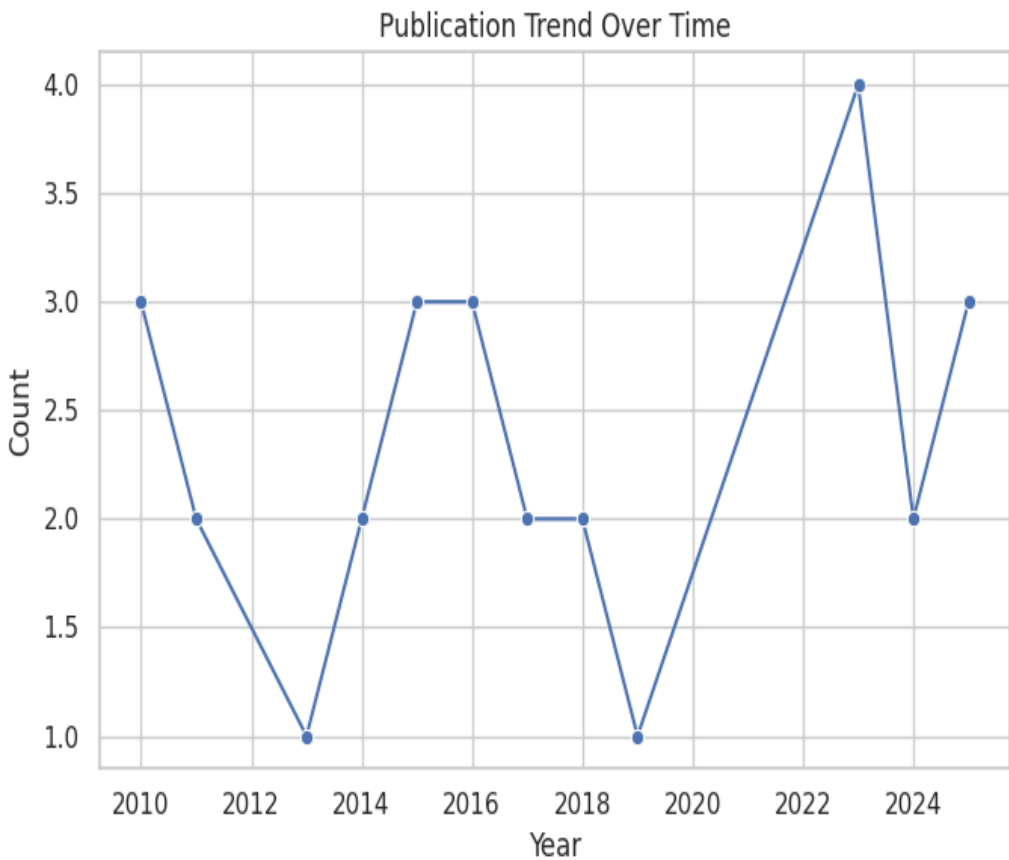


Figure 3. Publication trends.

3.1.2. Publisher’s Contribution

Recent discourse in academic literature has focused more on the governance of ICT and its transformation, with particular emphasis on journal articles and conference proceedings. These academic resources emphasise the importance of public sector innovation and accountability, as well as the use of technology. These findings reflect policymakers' and researchers' interests in using ICT to improve efficiency, generate public value, and tackle ethical challenges. The literature reviewed includes both peer-reviewed sources and grey literature. In total, this research analysed 40 publications, 42.5% are journal articles, 35% are conference proceedings, 12.5% are government reports, 5% are book chapters, and 5% are dissertations, as detailed in Table 2.

The Southern Africa region is the most dominant in terms of publication volume, suggesting that research on ICT governance adoption in public sectors is thriving there. North African nations, Morocco and Egypt, as well as Ghana in West Africa and Tanzania in East Africa, follow suit, a clear indication of a regional concentration of research that may imply a coverage gap across African nations, as shown in Figure 4.

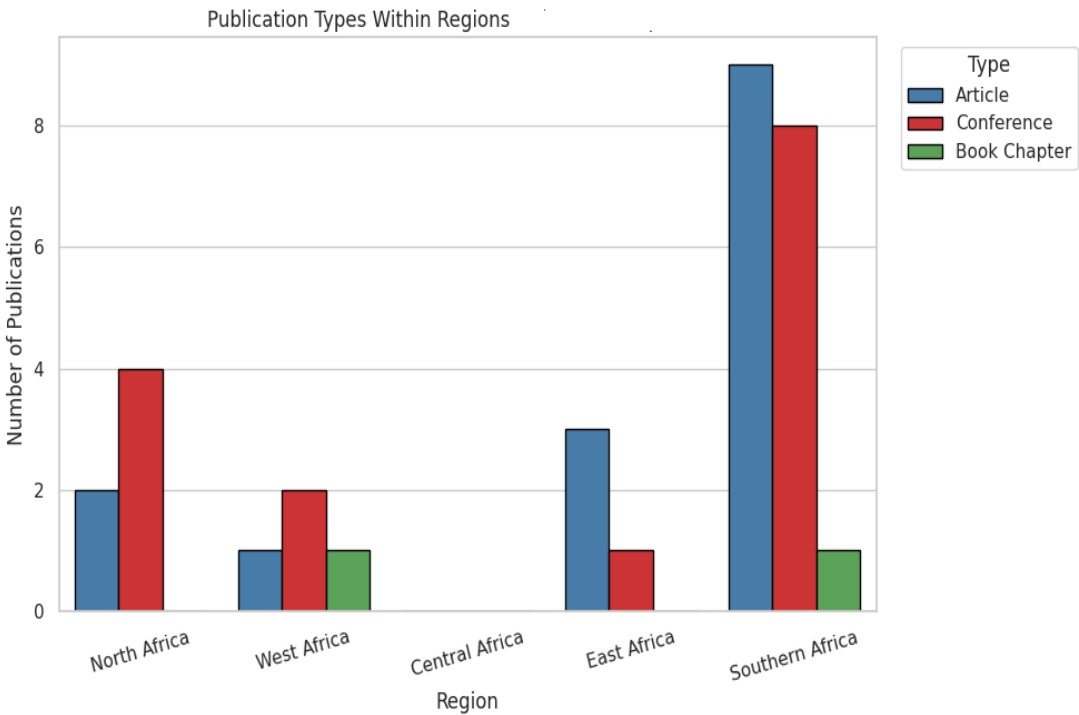


Figure 4. Regional contribution.

Further, a more detailed regional analysis reveals interesting differences between countries. For instance, South Africa has the highest and most well-rounded research output, with 9 articles and 8 conference papers. This shows that the ICT governance sector is well established in this country. Similarly, Morocco has two articles and two conference papers to its name, indicating that its ICT governance sector is still evolving and publishing research through various means. Ghana has contributed to all three types of research outputs: 1 article, 1 conference paper, and 1 book chapter, indicating that its ICT governance sector is still in its conceptual stage. Similarly, Tanzania has contributed two articles and one conference paper to date. Egypt has contributed only two conference papers to date, indicating its focus on disseminating research through conferences. Ethiopia and Nigeria have contributed only one article and one conference paper each, showing that these are emerging areas in ICT governance. The dominance of South Africa in terms of quantity and variety of research output vis-à-vis other countries shows that ICT governance is still in its infancy in these countries.

3.2. *ADO Framework Content analysis*

This segment synthesises findings from the identified studies to explore the antecedents, decisions, and outcomes that affect the adoption of ICT governance in Africa’s public sector. Figure 5 shows the ADO framework, highlighting the themes employed to analyse 40 publications. The research groups findings into three areas of ICT governance: structural mechanisms, processes, and relational mechanisms.

3.2.1. Antecedents

Antecedents are factors that influence whether individuals engage in or avoid behaviours. In the context of ICT Governance in the African public sector, they were further broken down into barriers and enablers which affect participation and avoidance behaviours.

3.2.1.1. Enablers

The analysis of enablers identified three pillars of ICT Governance, with the authors citing each mechanism proportionally: process (20 references), relational (19 references), and structural (11 references). Process mechanisms were the most dominant enablers at 52%, which specify the methodologies and frameworks an organisation might use to execute its governance. Structural mechanisms accounted for 22% of the enablers, outlining the formal structures and roles needed to legitimise ICT Governance activities. Relational mechanisms represented 36% of the enablers, underscoring the importance of leadership culture, behavioural dynamics, and stakeholder relationships in adopting ICT Governance. Table 3 presents each pillar with its corresponding themes. Code accompanied each theme, derived from the literature synthesis, and a list of author references.

3.2.1.2. Barriers

A synthesis of the literature identified various barriers affecting the adoption of ICT Governance in the African public sector. The distribution of author references by mechanism was as follows: process mechanisms (11 articles), structural mechanisms (12 articles), and relational mechanisms (24 articles). Process mechanisms, accounting for 24% of the identified barriers, involve finance, strategy, and procedures. The results show that the public sector in Africa is challenged by the implementation of policy into processes. Structural mechanisms, accounting for up to 25% of the barriers, included physical and organisational challenges that hindered the adoption of ICT governance. Relational mechanisms represent 50% of the barriers involve soft determinants of ICT governance, such as organisational culture, stakeholder behaviour, and leadership competence. The dominance of relational barriers mechanisms emphasises the need to address human-centric factors, which are often the most challenging barriers to overcome. Table 4 displays each barrier organised by pillar and related themes, with each theme supported by codes from a literature synthesis and a list of author references.

3.2.2. Decisions influencing ICT governance adoption

The study identifies several factors influencing IT governance adoption, presented through thematic clustering. Based on the sources cited by the author, the distribution of ICT governance adoption mechanisms is as follows: process mechanisms (23 articles), structural mechanisms (16 articles), relational mechanisms (5 articles). Process mechanisms accounted for 53% of the decisions and represent operational aspects of IT Governance adoption, including organisational choices regarding standards, strategic integration, and risk and resource management. The structural mechanisms accounted for 36% of the decisions. They represented a crucial cluster, as they involved the formal organisation of ICT Governance, such as defining roles, establishing oversight bodies, and assigning authority. The findings suggest that the adoption of ICT Governance depends heavily on a shift from informal IT management to formalised, bureaucratic structures that legitimise decision-making authority. Although fewer in number, relational mechanisms emerged as a vital cluster, emphasising interpersonal and cultural aspects of adoption. This cluster accounted for 11% of the decisions influencing ICT Governance adoption. It includes decisions related to collaboration, shared accountability, and the strategic positioning of IT within the wider organisational culture. The findings suggest that effective ICT governance depends on decisions that integrate technical information technology functions with administrative and political leadership. The importance of process-oriented mechanisms implies that operational formalisation and resource control are key factors in the adoption of ICT governance. Conversely, the lower frequency of relational mechanism decisions may reflect an underestimation of soft skills necessary to sustain IT Governance innovations. Table 5 presents each decision by pillar and theme, with each theme accompanied by codes derived from literature synthesis and a list of authors' references.

3.2.2. Outcomes influencing ICT governance adoption

The synthesis revealed that the outcomes shaping ICT governance adoption in the African public sector are unique. Each dimension contains both positive outcomes (benefits) and negative outcomes (risks) associated with adopting or not adopting ICT governance. The synthesis categorised the outcomes based on the number of author references: process (positive: 26 articles, negative: 3 articles), structural (positive: 0, negative: 3 articles), and relational (positive: 15 articles, negative: 0). Positive process mechanism outcomes account for 63% of positive outcomes and 50% of negative outcomes. Process outcomes include both tangible operational efficiencies and intangible operational inefficiencies that influence the adoption of ICT governance. Relational outcomes represent the intangible benefits of ICT governance, emphasising accountability and alignment between IT and business strategy. These outcomes account for 37% of the positive findings, with no linked negative outcomes. By contrast, structural mechanisms make up 50% of the negative findings and are mainly associated with risk indicators that promote adoption due to concerns about potential failure. Table 6 shows each outcome, its respective pillar, and the related theme. Codes from the literature synthesis support each theme and include a list of author references.

Table 6. Outcomes to ICT governance adoption.

Theme	Total Counts	Codes	Key References
A-Positive Process Related Outcomes (PPRO)			
PPRO1: ICT Governance -Driven Service Delivery and Operational Performance Gains	12	Improved Service Delivery Administrative Improvement Operational Excellence Institutional Performance Value Creation	[5,37–39,41,43,46,50,57,58,70,71]
PPRO2: Public Value Realisation and Cost Efficiency through ICT Governance	7	Resource Optimisation Cost Effectiveness Risk Mitigation	[24,41,42,45,49,57,62]
PPRO3: ICT Governance Risk Control, Compliance Improvement and Adaptive Governance	7	Improved Compliance Governance Agility Business Continuity	[42,49,50,55,57,62,70]
Negative Process Outcomes (NPO)			
NPO1: Persistently Low ICT Governance Maturity Limiting Effectiveness	3	Low Maturity Levels	[5,48,53]
C: Relational Mechanisms Enablers (RME)			

RMBO1: Trust, Transparency and Accountability Strengthened by ICT Governance	7	Institutional Trust Board Assurance Transparency and reporting Corruption reduction	[5,40,49,50,61,65,72]
RMBO2: Strategic Alignment and Realisation through ICT Governance	6	Strategic Alignment Strategic Realisation Strategic Goal Support	[38,39,46,48,59,66]
RMBO3: Stakeholder Capability Development, Satisfaction and Agility under ICT Governance	3	Advanced ICT Governance Skills User Satisfaction. Agility	[44,49]

Structural Mechanism-Based Outcomes (SMBO)

Positive Structural Outcomes: No positive structural mechanism outcomes were identified

Negative Structural Outcomes (NSMBO)

NSMBO1: System Fragmentation and Strategic Misalignment from Weak ICT Governance	3	System Fragmentation	[51,59,67]
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3.2.2. Consolidated ADO framework

The synthesis of Antecedents, decisions and outcomes is consolidated in Figure 5 below.

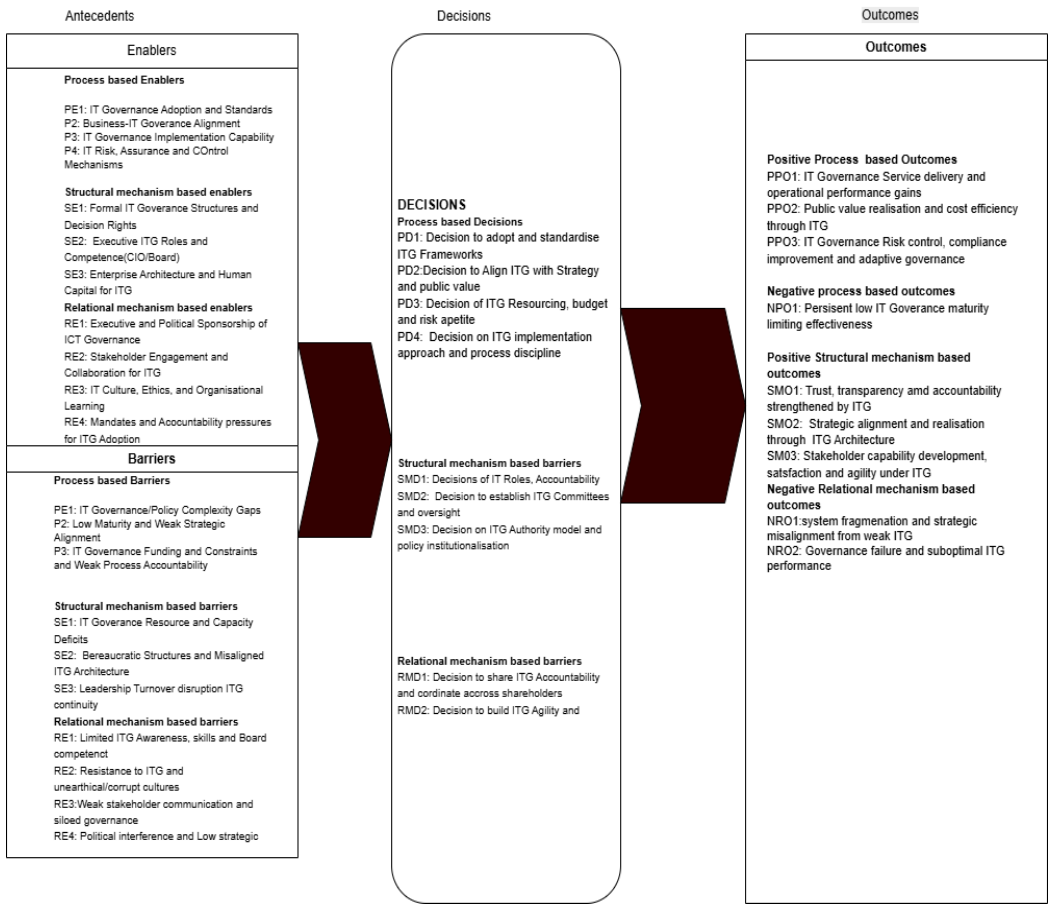


Figure 5. ADO diagram.

3.3. Mapping of ADO to McClelland’s Theory of Needs

Adoption is a stage at which technology is adopted or implemented within an organisation [73]. Motivation drives technology adoption, while external factors and motives control behaviour. Understanding individual needs enables inference of motivational factors, thereby assisting managers in predicting behaviour through appropriate motivators [74]. The current research maps ADO outcomes onto McClelland’s Theory of Needs, which divides human needs into three main areas: Need for Achievement (n.Ach), Need for Power (n.Pow), and Need for Affiliation (n.Aff). Achievement focuses on effective action and performance improvement, power focuses on influence, prestige, and control over resources and affiliation focuses on the creation of legitimate, trusted, and cooperative close relationships with others [75]. In this study, Need for Power uses enablers, such as executive sponsorship, to guide decisions on standardisation and oversight, leading to robust risk management and flexible governance, while Need for Affiliation emphasises collaborative enablers to promote shared accountability, thereby strengthening trust and transparency while reducing challenges caused by siloed governance and Need for Achievement focuses on strategic alignment and human capital to direct decisions that enhance ICT Governance agility and value. These findings imply that when enablers effectively address structural and cultural barriers, they result in high-performing, strategically aligned ICT Governance outcomes. These three needs are interconnected: power sets the structure and mandate, achievement creates value, and affiliation fosters collaboration. Figure 6 demonstrates the mapping of ADO outcomes to McClelland’s theory of needs.

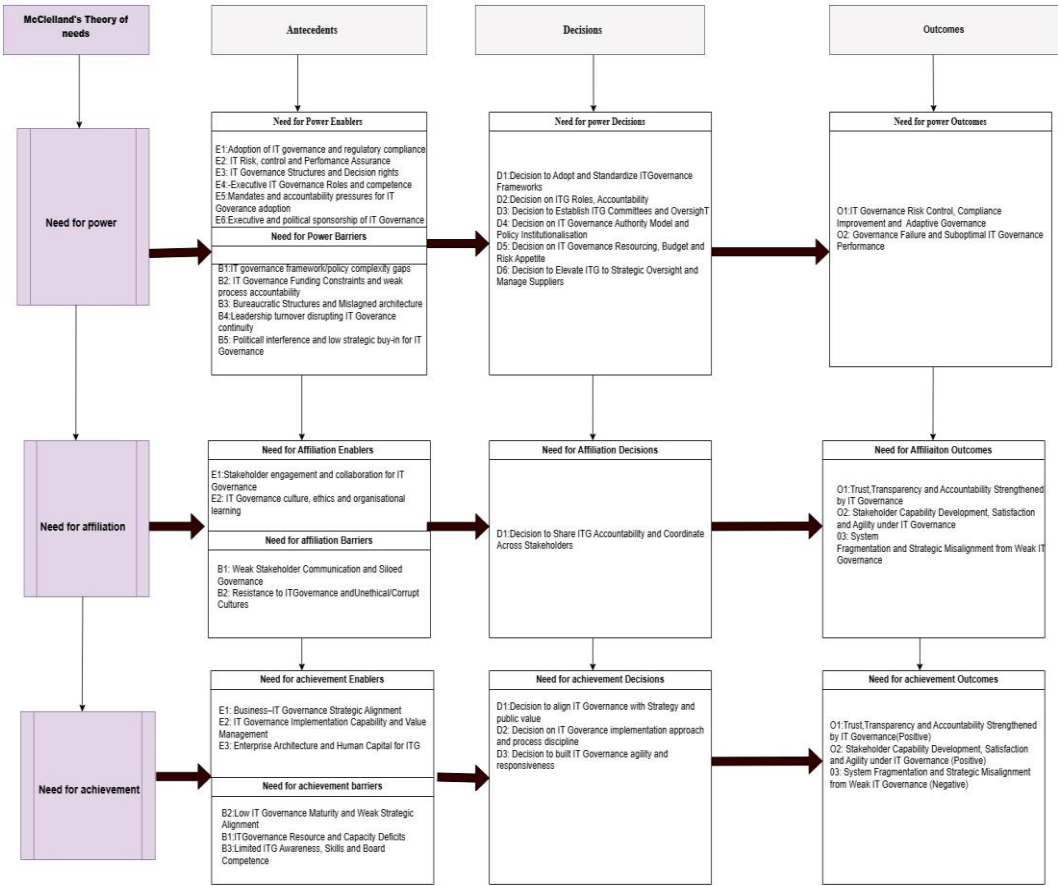


Figure 6. Mapping of ADO to McClelland's theory.

4. Discussion

This systematic synthesis study compiled secondary evidence on ICT governance adoption in the African public sector using the SPAR-4-SLR protocol and ADO framework. McClelland's theory of needs provides an interpretive framework for the findings. The review analysed scholarly articles and grey literature from 2010 to 2025 and noted a significant increase, particularly after 2016. There is a discernible bias towards Southern Africa, suggesting a possible gap in the research from other regions. This shows that ICT governance adoption in Africa is not uniform: some countries align with the global standard, while others remain fragmented, as the findings suggest. The study emphasises the need for cross-regional knowledge sharing to prevent the emergence of isolated governance models that hinder continent-wide digital progress.

The examined antecedents, decisions, and outcomes that influenced the adoption of ICT governance were categorised into three mechanisms, namely structure, process, and relational, which are essential for effective governance. Additionally, enablers and barriers further classify antecedents. In the primary process pillar, antecedent enablers include adopting existing governance frameworks, complying with relevant regulations, aligning business and IT strategies, improving controls for risk and performance, and managing capabilities and value. On the other hand, process barriers include funding, immature governance, and complex policies. Process decisions aim to ensure that public value governance aligns with information and communication technology (ICT), that an appropriate implementation framework is adopted, that resources are used efficiently, and that incremental changes are implemented. The results of process decisions are inconclusive, but positive outcomes include improved services, cost efficiency, and risk control. Negative outcomes involve system fragmentation and high compliance rates without corresponding improvements. Structurally, CIO leadership, skills, and formal bodies such as steering committees support ICT governance, while skills and resource gaps, leadership turnover, and bureaucratic inertia undermine it. Consequently,

decisions related to roles, committees, and authority allocation can either increase oversight and alignment or create strategic misalignment and limited operational impact when ICT governance is misconfigured. On the relational pillar, although results indicate they are a few in number, they are significant because they aim to improve collaboration, accountability, and executive support. Engagement with stakeholders, political sponsorship, and learning are enablers of ICT governance, while political intervention, communication, lack of board awareness, and resistance are barriers. Relational approaches, therefore, lead to coordination, create value, and build trust, but failure in this domain can lead to benefits leakage. From these findings, process factors were predominantly examined throughout the research, as they are vital for decision-making and monitoring of ICT governance, without displacing the importance of the other pillars, which are equally essential. Moreover, mapping ADO findings onto McClelland's Theory of Needs revealed that effective ICT governance is a harmonious blend of the drivers of power, affiliation, and achievement motivation. The Need for Achievement (nAch) significantly influences decisions regarding the adoption and standardisation of various frameworks to enhance service quality. Consequently, organisations with a high Need for Achievement are engaged in creating public value and committed to meeting international standards of excellence. The Need for Power manifests through structural dimensions, such as the establishment of roles and responsibilities and the creation of oversight committees, reflecting a desire for control. The findings revealed that ICT governance is affected by a motivational mismatch that occurs when the Need for Power misaligns with unethical organisational cultures. In such scenarios, political interference may arise, thereby affecting ICT governance maturity. Linking to the Need for Affiliation revealed that ICT governance failures across various African nations result from a motivational mismatch in which the Need for Power is more dominant than the Need for Achievement related to service efficiency. In such scenarios, ICT governance is a tool for control rather than a catalyst for progress. For successful adoption of ICT governance, it is essential to balance three needs: achieving efficiency through the need for achievement (nAch), ensuring legitimate control through the need for power (nPow), and promoting stakeholder collaboration through the need for affiliation (nAffi). This finding aligns with the determinants of ICT governance success, which relate to nPow through structures (committees), to nAch via processes (monitoring), and to nAffi via relational mechanisms (collaboration) [3].

Reviews by [25,28] support the findings on the importance of structural and process-oriented enablers in ICT governance which are in this study. Additionally, the adoption of formal frameworks, such as COBIT and ITIL, in combination with the formal delegation of decision rights, is an important enabler of governance capability, as [29] note that strategic alignment is an important theme in the evolution of ICT governance as a knowledge domain. In the global literature on ICT governance, these enablers reflect a rational-linear model of maturation. However, this systematic literature review (SLR) has shown that, across much of Africa, the adoption of these frameworks is largely symbolic, and that organisations consistently exhibit a low level of ICT governance maturity, which manifests as institutional decoupling. The role of executive sponsorship resonates with the findings of [27,76], who highlight the political mandate's role in ensuring governance success, particularly in public sector organisations where bureaucratic barriers often hinder structural enablers. The current research distinguishes itself from and builds on the broader global literature by recognising deep relational barriers, as traditional systematic review methodologies have tended to attribute failures in ICT governance to technical, structural, and resource issues [77,78]. Although concepts of capacity and funding issues remain relevant, this review uniquely highlights unethical or corrupt cultures, political interference, and leadership changes as notable, actively disruptive forces within Africa. This shift redirects the discussion from a technical-rational perspective to a socio-political one where global frameworks typically assume a rational, stable organisational environment centred on optimisation. This study suggests that ICT governance in some public-sector environments in Africa faces resistance due to a focus on transparency and accountability that conflicts with normative beliefs. The changes in political leadership expose new challenges that are not well considered in Western countries, as the instability of the institution can undermine the established structures within

a short period. The combination of the governance frameworks and the socio-political resistance **create** a paradoxical environment. On the one hand, the combination of ICT, strategy, and public value enhances public service delivery and stakeholder satisfaction, as shown [26]. On the other hand, the state of ICT governance is poor and fragmented despite the adoption of international standards. While the wider literature often describes a linear progression in which framework implementation naturally leads to higher maturity, this may not apply in the African public sector, revealing a reality of institutional disconnection. While organisations may benefit from the symbolic advantage of ICT governance, the relational barrier to organisational agility persists. This trend is similar to the geographical pattern: more advanced ICT governance-led systems, as seen in South Africa, have an equalising effect, while in developing countries, governance is fragmented.

Contributions

Theoretical contribution

This study links ICT governance mechanisms, institutional conditions, and motivational drivers to shift from a framework-focused perspective to a more theory-based understanding of governance in African public organisations. It enhances the conceptual understanding of governance by systematically categorising all antecedents, decisions, and outcomes into three groups: structural, process, and relational mechanisms. Additionally, it broadens the ADO framework by adding a Socio-Political Moderator dimension to the ICT governance adoption framework. The study contends that relational barriers, such as corruption and political interference, not only impede progress but can also undermine structural enablers. Additionally, whereas common ICT governance structures and models emphasise structure and process, the present study adds to the theoretical debate by moving beyond mere compliance. It incorporates the ADO framework with McClelland's theory of needs in the context of the human aspects and determinants of organizational resistance and adoption.

Practical contributions

From a practical perspective, the research has significant implications for chief information officers and policymakers in Africa, as it indicates that investments in process-related tools, such as frameworks, policies, and maturity models, will be inadequate on their own without establishing relational factors and power through political mandates. This finding also supports previous research on the implications of poor institutionalisation, where benefits leakage occurs, and investments in technology do not automatically translate to a return in the form of public value creation [53]. As such, management must focus on relational strategies, the creation of an ethical organisational culture, and stakeholder engagement as a precursor to structural advancement. The antecedents, decisions, and outcome factors identified in the research offer practical applications for management, reinforcing the importance of ICT governance awareness at the leadership level, the creation of formal governance structures, and the use of performance metrics, top management support, and vision.

Limitations and future research

This study's synthesis has several limitations. The geographical evidence base is uneven, with a disproportionate focus on South African literature and limited representation from other regions. Consequently, the generalisability of findings is restricted, as identified patterns may mainly reflect the more formalised aspects of ICT governance rather than the full range of institutional realities across the continent. This imbalance partly results from reliance on Scopus and Web of Science as the sole search databases. Methodologically, categorising all findings under the three pillars may obscure important contextual micro-behaviours and political dynamics during the coding process. Moreover, although mapping ADO findings to McClelland's theory provides valuable insights, this approach remains untested empirically, as the study relies on secondary data and does not directly examine individual motivations. Future research should use longitudinal and cross-national designs across various African settings to accurately represent the continent's understudied areas, where service impacts and risks are high. Further, methodological research should go beyond behavioural studies based on McClelland's theory and sector-specific frameworks.

5. Conclusions

This study systematically examined ICT governance adoption in Africa's public sector, bridging the gap between frameworks and understanding behavioural factors behind success or failure. Using McClelland's Theory of Needs and a systematic review guided by the SPAR-4-SLR framework and ADO perspective, the research categorises all findings into three pillars: structural, relational, and process. It shows that, while formal, process-focused enablers like framework adoption and strategic alignment are crucial, their effectiveness depends heavily on a volatile socio-political environment. Analysis of these ADOs through McClelland's framework shows that there is a logic to behaviour in which need for power drive control-oriented structures, needs for achievement drive performance-oriented processes, and needs for affiliation drive conditions necessary for ICT governance to be effective. When these needs are out of balance, there is a tendency for outcomes to stagnate. Additionally, McClelland's framework shows that a Need for Power drives ICT governance behaviour, whereas needs for achievement and affiliation inhibit improvements in ICT performance and the institutionalisation of ICT governance. In the absence of balance, ICT governance becomes a farce. It fails to deliver public value, leading to institutional decoupling in which organisations present their governance structures for a Need for Power (nPow) through oversight practices while showing low maturity and fragmented systems. However, barriers such as political interference, an unethical organisational culture, and rapid leadership turnover derail these activities. From the regional analysis, it is clear that South Africa acts as a mature hub with balanced research output. Further, the geographic analysis indicates that ICT governance development across African countries is inconsistent: some countries have adopted global IT standards, while others exhibit significant fragmentation in their development.

These findings emphasise that ICT governance in Africa's public sector mainly depends on relational and motivational factors, supporting the idea that structure follows culture. In a nutshell, for ICT governance to go beyond symbolic compliance and deliver real public benefits, practitioners and policymakers should focus on building relational enablers such as ongoing political support and ethical commitments which is achieved by aligning organisational motivations, transforming nPow into constructive accountability, and fostering a Need for Affiliation (nAff) through collaborative work with stakeholders to address problems related to leadership transitions and bureaucratic delays. Ultimately, the research argues that to achieve governance maturity in Africa, there is a need to change organisational behaviour so that the pursuit of excellence is sustained through political instability, ensuring that ICT governance mechanisms drive digital transformation rather than merely serve as bureaucratic processes.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Appendix A.1

Table A1. Articles included in the screening.

Article	Title	Author(s)
Article	Implementation of suitable information technology governance frameworks for Moroccan higher education institutions	[37]
Article	ICT governance: South Africa	[63]
Article	Developing digital capabilities through IT governance: a PLS-SEM analysis in Moroccan higher education institutions	[55]
Article	Exploring Factors Impacting Information Technology Governance Implementation Maturity in Institutions of Higher Education, South Africa: Application of the Will-Skill-Tool Model	[9]
Article	Information Communication technology governance practices in universities: A case study of a university of technology in Durban, South Africa	[71]
Article	Investigating drivers of information technology governance in South African public healthcare sector	[49]
Article	An investigation into the governance of information technology projects in South Africa	[66]
Article	An analysis of Cobit 5 as a framework for the implementation of it governance with reference to King III	[40]
Article	Public Perceptions of the Role of IT in Resolving Governance Challenges in a Transition State: The Case of Tanzania	[61]
Article	Evaluating the IS/IT Benefits Management Practice in South African Organizations	[53]
Article	Critical Success Framework for Implementing Effective IT Governance in Tanzanian Public Sector Organizations	[79]
Article	Criteria Towards Sound Information Technology Governance	[39]

Article	Devising a strategy for IT governance implementation in municipalities. A case study of South Africa	[80]
Article	Exploring institutional logics to dynamic ambidexterity in health information system implementation in the public health sector of Ethiopia	[59]
Article	Information Technology Governance Barriers, Drivers, IT/Business Alignment, and Maturity in Ghanaian Universities:	[48]
Article	IT governance in the healthcare sector: a case study of a public and private hospital in Tanzania	[67]
Book chapter	Information technology governance practices and inhibitors in South African private and public health care	[52]
Book chapter	Towards a Conceptual IT Governance Framework for Developing Countries	[43]
Conference	A Practice-Based Study on the Challenges of IT Governance Auditing in Ghana	[64]
Conference	Principles for Assurance on Corporate Governance of ICT	[72]
Conference	Information Technology Governance in Public Sector Organizations	[57]
Conference	Assessing the Factors Influencing Information Technology Investment Decisions: A Survey of Sampled Public Sector Organizations in Tanzania	[81]
Conference	Towards an Integrative Theoretical Model for Examining IT Governance Audits	[51]
Conference	Alignment of COBIT 5 and ITIL v4 Frameworks Through an Ontology: Towards Improved Maturity of IT Processes	[62]
Conference	Good corporate governance of ICT in municipalities	[60]
Conference	Towards corporate governance of ICT in local government	[47]
Conference	Validation of the framework for corporate governance of ICT in local government	[46]

Conference	Information technology governance in Egypt Research institutions - a case study	[58])
Conference	From e-government strategy to services: challenges of inter-organizational IT governance in Egypt	[68]
Conference	Review of IT Governance Frameworks Implementation in the Context of the South African Public Sector	[5]
Conference	A Viable Systems Model for Implementing IT Governance	[38]
Conference	The institutionalisation of political and corporate governance of information and communication technology in the public service of South Africa	[50]
Conference	TOWARDS AN EFFECTIVE BASELINE OF IT GOVERNANCE MECHANISMS IN HIGHER EDUCATION INSTITUTION	[56]
Government report	A Municipal Guide / Roadmap To Successful ICT Governance Public Service Corporate	[54]
Government report	Governance of Information and Communication Technology Policy Framework.	[69]
Government report	Knysna Municipality ICT Governance Framework	[82]
Government report	STRATEGIC PLAN	[65]
Government report	Merafong Municipality Information technology governance implementation in a South African public sector agency: Institutional influences and outcomes. Information Technology Governance Implementation in a South African Public Sector Agency: Institutional Influences and Outcomes	[42]
Dissertation	Compliance Framework for It Governance Adoption and Use By State-Owned Entities in South Africa.	[45]

Appendix A.2

Table A2. Summary of PRISMA 2020 checklist.

Section and Topic	Item#	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review	Title (p.1)
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Abstract (p.1)
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Introduction (p.2-4)
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Introduction (p.4)
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Materials and section- Sec 2 p. (5-6)
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Sec. 2- Scopus, Web of Science, (2010–2025) (p.5,7)
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Materials and methods – Table 1.(p.6)
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Materials and methods Sec 2. Assembling and Arranging (p.5-6)
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Materials and methods (p.5-7)
Data items	10a.	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Sec. 3.2- ADO framework-based content analysis (p.10-17)
	10b.	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Sec.3.1- Descriptive overview (p.7-10)

Study risk of bias Assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Omitted because standard empirical tools are incompatible with this review's heterogeneous mixed data
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/A
Synthesis methods	13a.	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Materials and methods (p.5-7)
	13b.	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics or data conversions.	Materials and methods (p.5-7)
	13c.	Describe any methods used to tabulate or visually display the results of individual studies and syntheses.	Tables 1–6 and Figures 1–6, Appendices A.1 and A.2
	13d.	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	N/A
	13e.	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f.	Describe any sensitivity analyses conducted to assess robustness of the synthesized results	N/A
	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	No reporting bias arises in the study
	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Certainty of evidence in this bibliometric study was assessed based on database reliability (WoS, Scopus) and journal impact factors
RESULTS			
Study selection	16	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Materials and methods (p.5-7) Figure 2 SPAR-4-SLR flow diagram

		Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	All studies related to keyword searches that met the inclusion criteria were included. Sec.2. (p.6)
Study characteristics	17	Cite each included study and present its characteristics.	Citation for each study is done
Risk of bias in studies	18	Present assessments of risk of bias for each included study. For all outcomes, present, for each study:	Was not applied in this study
Results of individual studies	19	(a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e. g. confidence/credible interval), ideally using structured tables or plots.	Sec.3.2 ADO framework content analysis (p.11-17)
Results of synthesis	20a.	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Sec.3.2 ADO framework content analysis and no bias tool was reported in this study
	20b.	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A
	20c.	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d.	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Not assessed
DISCUSSION			
Discussion	23a.	Provide a general interpretation of the results in the context of other evidence	Sec.4(p.19-21)
	23b.	Discuss any limitations of the evidence included in the review.	Sec.4(p.22)
	23c.	Discuss any limitations of the review processes used.	Sec.4(p.22)
	23d.	Discuss implications of the results for practice, policy, and future research	Sec 4. Contributions (p.21)
OTHER INFORMATION			
Registration and protocol	24a.	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	The review was not registered

Support	24b.	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Protocol was not prepared
	24c.	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
	25	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Funding information (p.23). No funding was received for this manuscript
	26	Declare any competing interests of review authors.	Conflicts of interest (p.23)
Competing interests		Report which of the following are publicly available and where they can be found:	
Availability of data, code and other materials	27	template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Data availability statement (p.23)

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