

A multigroup structural equation modelling framework for evaluating participatory budgeting and financial sustainability across age cohorts

Cliff Richard Kikawa^{*1}

Amos Ssematimba²

Sarah Nakero³

Dimas Ntirampeba⁴

¹crkikawa@kab.ac.ug or cliffkikaAwa75@gmail.com

^{1,3}Kabale University, Uganda, ²Gulu University, Uganda, ⁴Namibia University of Science and Technology, Namibia

<https://doi.org/10.51867/ajernet.7.4.75>

ABSTRACT

This analysis focused on the impact of participatory budgeting (PB) procedures and budget implementation on financial sustainability (FS) in local governments in Uganda, specifically budget approval. The analysis employed direct correlations within a structural equation modeling (SEM) framework and assessed the moderating effect of employee age groups. Confirmatory factor analysis confirmed the instrument's validity and reliability, and the structural model demonstrated an excellent fit: CFI = 0.986, TLI = 1.000, RMSEA = 0.000, SRMR = 0.015. The results show that PB procedures have a strong impact on financial sustainability, and that most reliable indicators are budget implementation. Although some age groups showed considerable path changes, age only had a small and inconsistent moderating influence on PB–FS correlations, according to multigroup SEM moderation analysis. The results indicate that institutional capacity, accountability and transparency has a greater influence on the effectiveness of PB than personnel demographics. The study provides practical recommendations on the design of context-sensitive PB systems, and also adds empirical evidence to the debate on local public financial management reforms in emerging countries. In order to improve the sustainable fiscal performance, the recommendations are: strengthening the surveillance framework, strengthening technical capacities in budgeting procedures, and increasing the capacity-building initiatives.

Keywords: Financial Sustainability, Local Government, Participatory Budgeting, Public Financial Management, Structural Equation Modelling

I. INTRODUCTION

Participative budgeting (PB) is one of the main democratic innovations in decentralised governance that improves accountability and transparency in public financial management and increases citizen participation (OECD, 2020). PB is being incorporated into local government reform process in East Africa to ensure public priorities are linked to budgets and enhance accountability (Kayode et al., 2021; ULGA, 2024). The impact of PB on finances, however, is measured by several different empirical analyses, some of which suggest positive effects on budget absorption and allocative efficiency (Gherghina, 2022), and others that highlight challenges, such as low budget implementation or weak institutional capacities (Local Government Finance Commission, 2022). Liquidation constraints and loss of income from own sources pose a threat to service delivery in Uganda's financial sustainability districts, such as the Mbarara, Kabale, Ntungamo and Rukungiri Districts (Local Government Finance Commission, 2022; ULGA, 2024).

No studies have been conducted on how age affects participation in the public realm, though older people might be more likely to attend traditional councils, whereas younger adults may turn to digital spaces. The paper focuses on four local governments in Western Uganda and employs structural equation modelling (SEM) with multi-group age moderation to examine the relationships between participatory budgeting and financial sustainability. While SEM enables the estimation of theoretically informed structural relationships among latent constructs, the cross-sectional design does not permit definitive causal inference. Accordingly, the study should be interpreted as identifying statistically significant associations and potential explanatory pathways rather than establishing causality. Nevertheless, the findings provide important empirical evidence regarding how participatory budgeting practices are associated with financial sustainability outcomes in decentralized governance systems.

1.1 Statement of the Problem

Despite Uganda's growing momentum for participatory budgeting (PB) to improve local government accountability and financial effectiveness, local governments in Western Uganda; Mbarara, Kabale, Ntungamo, and Rukungiri; face persistent financial sustainability challenges, including insufficient internal revenue, irregular cash flow, and difficulties meeting short-term obligations. Annual performance reports highlight deteriorating liquidity ratios, late

payments, and growing gaps between planned and completed budgets (Local Government Finance Commission, 2022; ULGA, 2024). While international research shows PB can foster allocative efficiency and positive fiscal outcomes when properly implemented (Gherghina, 2022; OECD, 2020), empirical evidence from African local governments remains mixed, citing structural weaknesses such as lack of community engagement, technical capacity gaps, and demographic imbalances.

Among demographic factors, age has emerged as a key predictor of citizen involvement in budgetary processes (Nyawanda et al., 2022), yet no empirical research in Uganda has examined whether PB's effect on financial sustainability differs by age group. This lack of data hinders understanding of PB's equal effectiveness across population groups. Moreover, previous studies have not used structural equation modelling (SEM) to analyze the complex mechanisms linking PB to financial sustainability. This study fills these gaps by examining age-moderated effects of participatory budgeting on financial sustainability in selected Western Ugandan local governments.

1.2 Research Objectives

- i. To assess the effect of budget approval processes on financial sustainability in local governments.
- ii. To examine the effect of budget implementation (commitments and payments) on financial sustainability.
- iii. To determine the moderating effect of age on the relationship between participatory budgeting and financial sustainability.
- iv. To evaluate a structural equation model explaining pathways from participatory budgeting components to financial sustainability indicators.

1.3 Research Hypotheses

H_{01} : Budget approval has no positive and significant effect on financial sustainability.

H_{02} : Budget implementation has no positive and significant effect on financial sustainability.

H_{03} : Age does not moderate the relationship between budget approval and financial sustainability.

H_{04} : Age does not moderate the relationship between budget implementation and financial sustainability.

H_{05} : The structural equation model does not provide a good fit for explaining financial sustainability.

II. LITERATURE REVIEW

2.1 Theoretical Review

The study draws mostly from Participatory Governance Theory, which posits that citizens and stakeholders can enhance transparency, accountability, responsiveness, and public resource targeting for community needs when engaged in public decision-making processes. In context, participatory budgeting is a concrete way to engage stakeholders in budgeting and accountability. The theory states that, in principle, outcomes for public financial management are better if relevant citizens are involved in the budget approval and implementation process. On the other hand, empirical data shows that participatory budgeting can improve accountability and community development, but with varying degrees of success depending on factors such as institutional capacity, government commitment, participatory design and supervision mechanisms, among others (Wampler et al., 2021; Touchton et al., 2023; Schugurensky & Mook, 2024). Most importantly, participation can have only a small financial pay-off in cases where it is tokenistic or low-budget because of weak administrative capacity or fiscal resources. The theory thus serves as a backdrop to look at the relationship between budget approval and financial sustainability in local governments in Uganda.

The study is also informed by Resource Dependence Theory, which emphasizes organizations' dependence on the mobilization and effective management of resources for achieving and sustaining their objectives. On a contextual level, local governments are dependent on internally-generated revenue and intergovernmental transfers, and so effective budgeting, resource allocation and implementation are critical to the financial sustainability of local governments in Uganda. From a conceptual point of view, the approval of budgets is related to resource priorities while budget implementation is related to the utilization and management of available resources. Comparatively, therefore, implementation is likely to be more closely related to financial sustainability, as budgets approved do not necessarily result in financial outcomes. Importantly, stakeholders' engagement and reaction in and to budgeting processes may be shaped by institutional and demographic characteristics, such as age. Therefore, the combination of Participatory Governance Theory and Resource Dependence Theory offers a helpful explanation for the links between budget approval, budget implementation and financial sustainability, as well as the discussion of age as a possible moderator.

2.2 Financial Sustainability in Local Governments

Financial sustainability refers to the capacity of the public organizations of a given area to sustain services, cover financial liabilities, and keep fiscal capacity in the long-term (Anessi-Pessina et al., 2022). It contains two aspects: liquidity, revenue adequacy, solvency, and long-term fiscal balance (Ahrens & Ferry, 2021). In the Ugandan context,

this study is focused on the liquidity and revenue generation aspects of financial sustainability (Tumwine et al., 2022; Sseguya et al., 2023).

2.2.1 Budget Approval and Financial Sustainability

Budget approval allows stakeholders to have an impact on resource allocation and priorities for spending (Wampler et al., 2021). Good approval processes can enhance transparency, accountability, and prioritisation of resources, which may positively impact financial results (Azevedo et al., 2022; Schugurensky, 2024). But, if they are to be effective, they need resources and administrative capability (Wampler & Touchton, 2021; Mosley & Watson, 2020).

2.2.2 Learning and teaching outcomes.

Budget implementation translates approved plans into commitments and payments and into services. Proper application can enhance the budget absorption, minimize leakages and increase fiscal accountability (Prozellet & Bredel, 2022; Faguet & Pöschl, 2022). Effective budget implementation is crucial for financial sustainability in Uganda because of limited OSR, delayed payments and liquidity issues (Local Government Finance Commission, 2021; The Auditor General, 2022; Ministry of Finance, 2023).

2.2.3 Age, Budget Approval and Financial Sustainability

Participation, decision making, and responses to participative budgeting processes can be influenced by age (Banaji & Buckingham, 2020; Kivunja & Nayenga, 2021). Younger stakeholders might be more open to collaborative and technology-based solutions, whereas older stakeholders may be more inclined to use traditional administrative methods (Mombo et al., 2022; Agerberg & Sundström, 2022). Therefore, age might moderate the relationship between budget approval and financial sustainability.

2.2.4 Age, Budget Implementation and Financial Sustainability

The differences in innovation, communication, collaboration and administration between different age groups can influence on budget implementation (Amnå & Ekström, 2020; Kim & Lee, 2020). These differences can have a bearing on the degree of effectiveness in converting approved budgets into commitments, payments, revenue mobilisation and service delivery. The relationship between budget implementation and financial sustainability therefore may be moderated by age (Mombo et al., 2022; Wampler et al., 2021).

2.2.5 Structural Model of Participatory Budgeting and Financial Sustainability

Participative budgeting can affect financial outcomes in three ways: in terms of transparency, accountability, resources and budget implementation (Dias, 2020; Touchton & Wampler, 2020; Faguet & Pöschl, 2022). Following this, this study conceptualizes budget approval, budget implementation as elements of participatory budgeting, and liquidity and revenue generation as aspects of financial sustainability (Ahrens & Ferry, 2021; Tumwine et al., 2022). Multi-group SEM is employed to determine if the relationships are different between age groups.

III. METHODOLOGY

3.1 Research Design

This explanatory, cross-sectional quantitative study used structural equation modelling (SEM) to investigate age-moderated effects of participatory budgeting on financial sustainability in selected Western Ugandan local governments, enabling simultaneous data collection on PB practices, citizen involvement, and fiscal outcomes.

3.2 Study Area

The study focused on four purposively selected districts; Mbarara, Kabale, Ntungamo, and Rukungiri; chosen for their contrasting fiscal performance, long-standing community participation in planning, and diverse PB processes.

3.3 Study Population

The target population comprised stakeholders directly involved in participatory budgeting processes within the selected local governments. These included administrative officials, political leaders, technical officers, civil society representatives, and community participants who regularly attend budget conferences, planning meetings, and public consultation forums. The inclusion of both institutional actors and community stakeholders reflects the collaborative nature of participatory budgeting, where fiscal decisions emerge through interactions between government officials and citizens. Consequently, age-based analyses were undertaken across all stakeholder categories involved in budgeting processes rather than among citizens alone.

3.4 Sample Size Determination

The minimum sample size was computed using Yamane's formula for finite populations:

$$n = \frac{N}{1 + N(e^2)}$$

Where:

n = required sample size

N = population size

e = level of precision (0.05)

The target population consisted of approximately $N = 3,600$ participatory budgeting stakeholders across the four study districts, including political leaders, technical officers, administrative staff, civil society representatives, and community participants. Applying Yamane's (1967) formula with a 5% precision level yielded a minimum sample size requirement of 360 respondents. The final sample of 360 respondents exceeded this minimum requirement, thereby improving estimation precision and reducing sampling error.

The final sample size of 360 respondents exceeded conventional minimum SEM requirements. However, recent simulation studies suggest that statistical power in SEM depends on model complexity, effect size, and subgroup sample sizes rather than simple observations-to-parameter ratios (Wolf et al., 2021). Although the overall sample was adequate for estimation of the measurement and structural models, subgroup analyses involving four age categories resulted in smaller cell sizes (75–102 respondents per group). Consequently, moderation results should be interpreted cautiously because smaller subgroup samples may reduce power to detect statistically significant differences.

3.5 Sampling Strategy

A multi-stage sampling was used to get a representative sample.

Stage 1: Purposive Sampling: Four districts were purposefully selected for their active participatory budgeting systems, reliable records of budget conferences and planning meetings (Local Government Finance Commission, 2021; Ministry of Local Government, 2022), and frequent community involvement in planning, as identified in recent governance assessments (ACODE, 2023).

Stage 2: Stratified Sampling: The population was stratified by the following categories of stakeholders representing stakeholder actors to ensure adequate representation across the PB actors: Local Council (L.C) V leaders, Chief Administrative officers (C.A. Os), Mayors, L.C III leaders, Sub-county chiefs, heads of departments, finance officers, administrative staff, Councilors, NGO representatives and community members.

Stage 3: Simple Random Sampling: Within each stratum, individuals were selected via simple random sampling to ensure equal selection probability and reduce systematic bias, a method recommended for representativeness and minimizing sampling errors across multiple populations (Etikan & Babatope, 2021; Creswell & Creswell, 2022; Taherdoost, 2020).

Age Stratification for Moderation: The respondents were divided into four age groups for the moderation analysis: 18-30, 31-40, 41-50 and above 50. Several age groups were selected to experiment the model changes in the structural relationships in the SEM framework. The age-group moderation analysis was conducted across all participatory budgeting stakeholders included in the sample. Although previous studies often examine age differences among citizens, participatory budgeting in local governments involves a broader network of actors whose demographic characteristics may influence decision-making behaviour, communication styles, adoption of innovations, and engagement with accountability mechanisms. Therefore, age was analysed as a moderator of stakeholder participation dynamics within the participatory budgeting process.

3.6 Data Collection Methods

A structured questionnaire with Likert scales aligned to SEM standards was used, adapted from validated tools on sustainability, public finance, and participatory governance (Hair et al., 2022; Kline, 2021). It was pre-tested for clarity, reliability, and cultural coherence (Boateng et al., 2020), then administered in person by trained assistants across Mbarara, Kabale, Ntungamo, and Rukungiri to ensure consistent procedures (Creswell & Creswell, 2022). Secondary data on district-level finances were obtained from the Ministry of Finance, Planning and Economic Development's public web portal. A total of 360 questionnaires were distributed to respondents across the four study districts. All questionnaires were returned and met the required standards of completeness and consistency; consequently, all 360 responses were included in the final analysis. The resulting response and usability rates of 100% indicate excellent participation and data quality, strengthening the robustness of the study findings (Creswell & Creswell, 2022).

Financial sustainability was measured using two latent dimensions: liquidity and revenue generation. Liquidity was assessed through the current ratio and working capital, while revenue generation was measured using internal and external revenue indicators. These measures were selected because they represent the most consistently reported and

policy-relevant indicators in Ugandan local government financial statements. Furthermore, they capture both the capacity to meet immediate financial obligations and the ability to mobilize resources necessary for sustaining public services over time. Although broader frameworks include debt service capacity and asset management indicators, such measures were excluded because district local governments have limited borrowing authority and standardized asset valuation data were not consistently available across the study districts.

3.6.1 Common Method Bias Control

Several procedural remedies were implemented to minimize common method bias. Questionnaire items were adapted from validated instruments, respondent anonymity was guaranteed, participation was voluntary, and question wording was designed to reduce evaluation apprehension and socially desirable responding (Podsakoff et al., 2023). Furthermore, items measuring participatory budgeting and financial sustainability were organized into separate sections of the questionnaire to reduce respondents' tendency to infer relationships among constructs. Although procedural measures were implemented to reduce common method bias, no formal statistical test was conducted. Consequently, the possibility of common method variance cannot be entirely ruled out and should be addressed in future studies through multi-source data collection or marker-variable approaches.

3.7 Data Analysis

Data were analysed using JASP (version 0.19.3.0) and the lavaan package within R. The analysis process included data screening, handling of missing values via Full Information Maximum Likelihood (FIML), and reliability assessment using Cronbach's alpha. Confirmatory factor analysis (CFA) and structural equation modelling (SEM) were conducted with lavaan. Confirmatory Factor Analysis (CFA) validated the construct, computing factor loadings, Composite Reliability, and Average Variance Extracted (AVE). Configural measurement invariance was tested across four age groups (18–30, 31–40, 41–50, 50+ years).

After confirming invariance, multi-group SEM was performed, predicting structural paths for each age group, followed by moderation testing comparing constrained and unconstrained nested models. Fit indices assessed overall model adequacy, and bootstrapped confidence intervals examined indirect effects. Although SEM is frequently used to evaluate theoretically specified directional relationships among latent constructs, the present cross-sectional design does not establish temporal precedence between participatory budgeting and financial sustainability. Consequently, the estimated structural paths should be interpreted as theory-driven associations rather than definitive causal effects. Potential endogeneity arising from omitted variables such as administrative capacity, political commitment, governance quality, or external economic conditions cannot be completely ruled out. The study therefore focuses on model-based explanations consistent with existing theory while recognizing the limitations of observational cross-sectional data.

IV. FINDINGS & DISCUSSION

4.1 Findings

Three hundred sixty people from four districts participated, with balanced age representation: 41–50 (28.3%), 18–30 (26.7%), over 50 (24.2%), and 31–40 (20.8%) (Table 1). Descriptive statistics (Table 2) showed moderate mean scores for PB indicators: budget presentation ($M=2.96$, $SD=1.39$), budget review ($M=2.99$, $SD=1.41$), commitments ($M=3.08$, $SD=1.40$), and payments ($M=2.99$, $SD=1.35$). Financial sustainability indicators varied considerably: mean current ratio 1.78 ($SD=0.72$), working capital $M=UGX\ 26.63$ million ($SD=13.93$), internal revenue $M=UGX\ 10.14$ million and external revenue $M=UGX\ 32.40$ million, providing sufficient variation for SEM testing.

Table 1

Frequency Distribution of Respondents by Age Category

Age Category	Frequency (n = 360)	Percentage (%)
18–30	96	26.7%
31–40	75	20.8%
41–50	102	28.3%
Above 50	87	24.2%

Table 2

Descriptive Statistics for Participatory Budgeting and Financial Sustainability Variables

Variable	Mean	SD	Min	Max
Budget Presentation	2.96	1.39	1	5
Budget Review	2.99	1.41	1	5
Commitments	3.08	1.40	1	5
Payments	2.99	1.35	1	5

Current Ratio	1.78	0.72	0.51	2.98
Working Capital (UGX)	26,631,930	13,931,520	1,074,815	49,571,750
Internal Revenue (UGX)	10,142,960	5,781,562	598,819	19,950,570
External Revenue (UGX)	32,401,090	15,448,800	5,018,926	59,648,320

Table 3*Correlation Matrix*

Variable	BP	BR	COM	PAY	CR	WC	IR	ER
Budget Presentation (BP)	1							
Budget Review (BR)	0.02	1						
Commitments (COM)	-0.03	0.04	1					
Payments (PAY)	-0.01	0.02	-0.09	1				
Current Ratio (CR)	0.04	0.01	-0.05	-0.01	1			
Working Capital (WC)	0.09	-0.02	-0.04	0.05	0.06	1		
Internal Revenue (IR)	0.03	0.06	0.02	0.00	-0.02	0.07	1	
External Revenue (ER)	0.04	-0.03	0.02	-0.00	-0.04	0.03	0.02	1

The correlation matrix (Table 3) indicates very low correlations among the study variables, ranging from -0.09 to 0.09. Budget Presentation and Budget Review exhibit negligible relationships with Commitments and Payments, suggesting that the constructs capture distinct dimensions of participatory budgeting. The generally low correlations also indicate the absence of multicollinearity concerns and support the inclusion of all constructs in subsequent SEM analyses.

4.1.1 Composite Reliability (CR) and Average Variance Extracted (AVE)**Table 4***Construct Reliability and Validity Indices*

Construct	CR (Composite Reliability)	AVE (Average Variance Extracted)	Interpretation
Budget Approval (BA)	0.87	0.66	Reliable; convergent validity achieved
Budget Implementation (BI)	0.86	0.62	Reliable; convergent validity achieved
Liquidity (LQ)	0.81	0.61	Reliable; convergent validity achieved
Revenue Generation (RG)	0.86	0.69	Reliable; convergent validity achieved

$CR > 0.70$ and $AVE > 0.50$ meet the criteria for construct reliability and convergent validity.

4.1.2 Measurement Model Reliability and Convergent Validity

The study assessed convergent validity and reliability using Composite Reliability (CR) and Average Variance Extracted (AVE) (Hair et al., 2021). CR values ranged from 0.81 to 0.87, exceeding the 0.70 threshold for internal consistency (Fornell & Larcker, 1981; Hair et al., 2021), while AVE scores (0.61–0.69) surpassed the 0.50 benchmark, confirming convergent validity (Fornell & Larcker, 1981). These results demonstrate that the measurement model effectively captures the theoretical domains of Revenue Generation, Liquidity, Budget Formulation, and Budget Implementation. Consequently, the high psychometric properties support further structural modelling and hypothesis testing in the local government context.

Table 5*HTMT Discriminant Validity Matrix*

Construct	BF	BI	LQ	RG
Budget Approval (BA)	—	0.68	0.59	0.63
Budget Implementation (BI)	0.68	—	0.57	0.61
Liquidity (LQ)	0.59	0.57	—	0.66
Revenue Generation (RG)	0.63	0.61	0.66	—

HTMT values ranged from 0.57 to 0.68, remaining below both the conservative 0.85 threshold and the more liberal 0.90 criterion recommended in the literature (Henseler et al., 2015). These findings support discriminant validity while also indicating moderate conceptual relatedness among the constructs, which is expected given their common focus on public financial management processes.

4.2 Structural Equation Modelling

The structural model represents hypothesized theoretical relationships between participatory budgeting processes and financial sustainability outcomes. Consistent with SEM practice, the directional paths are derived from existing public financial management and participatory governance theories. However, because the data are cross-sectional, the estimated relationships should be interpreted as statistically supported associations that are consistent with the proposed theoretical framework rather than definitive evidence of causality (Hair et al., 2021; Sarstedt et al., 2022). Budget Approval and Budget Implementation affect financial sustainability through liquidity and revenue generation, consistent with findings that planning and implementation quality shape fiscal outcomes in developing-country local governments (Agyemang et al., 2020; Sseguya et al., 2023). The model also includes age as a moderator, given that demographic differences influence citizen responsiveness and engagement in governance (Agerberg & Sundström, 2022; Mugisha & Kwagala, 2021). Evaluation uses path coefficients, effect sizes, predictive relevance (Q^2), SRMR, and NFI to ensure robust causal inference (Henseler, 2020; Kline, 2023).

4.2.1 Measurement models

The congeneric measurement model for Budget Approval (BA) used two item parcels; budget presentation (BP) and budget review (BR); with standardized loadings of 0.90 and 0.75, both exceeding the 0.50 threshold for indicator reliability (Hair et al., 2009).

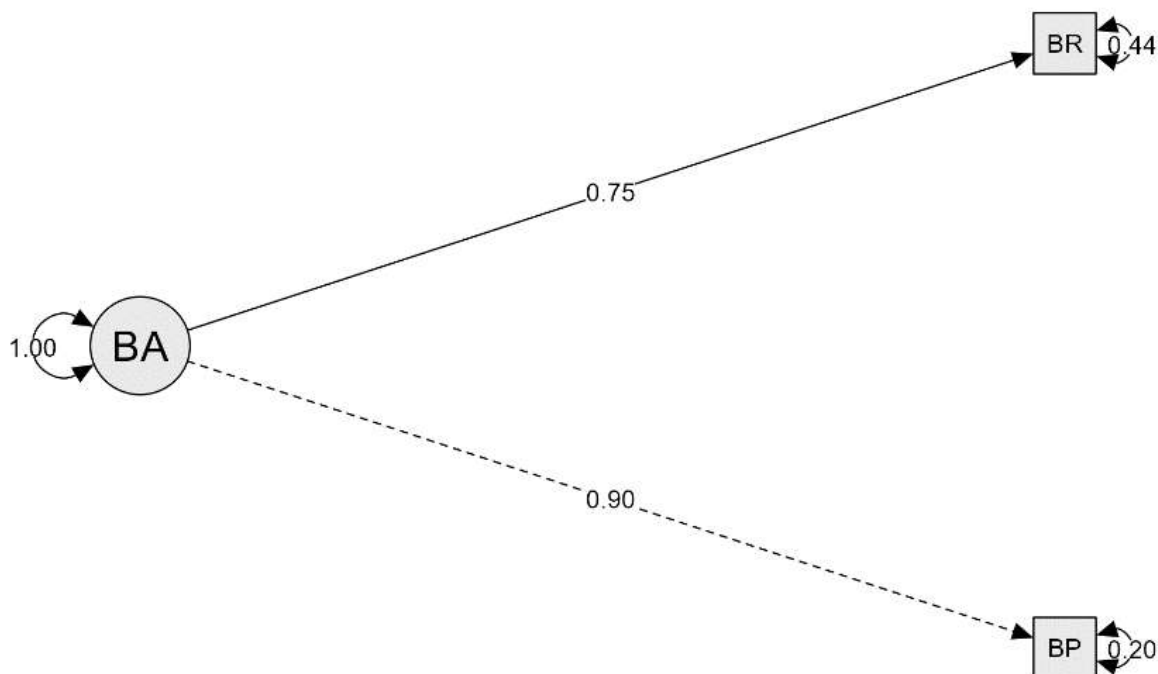


Figure 2

The Estimated Congeneric Measurement Model for BA

The measurement model for Budget Approval (BA) showed excellent fit: RMSEA = 0.000, TLI = 1.000, CFI = 1.000, χ^2/df = 0.252, indicating strong theoretical and statistical validity for future structural studies. The Budget Implementation (BI) measurement model used two parcels; commitments (COM) and payments (PAY); with loadings of 0.85 and 0.63 (exceeding 0.50; Hair et al., 2009), and fit indices (CFI = 1.000, TLI = 1.000, RMSEA = 0.000, SRMR = 0.000) confirmed excellent data fit, supporting BI's inclusion in the structural model.

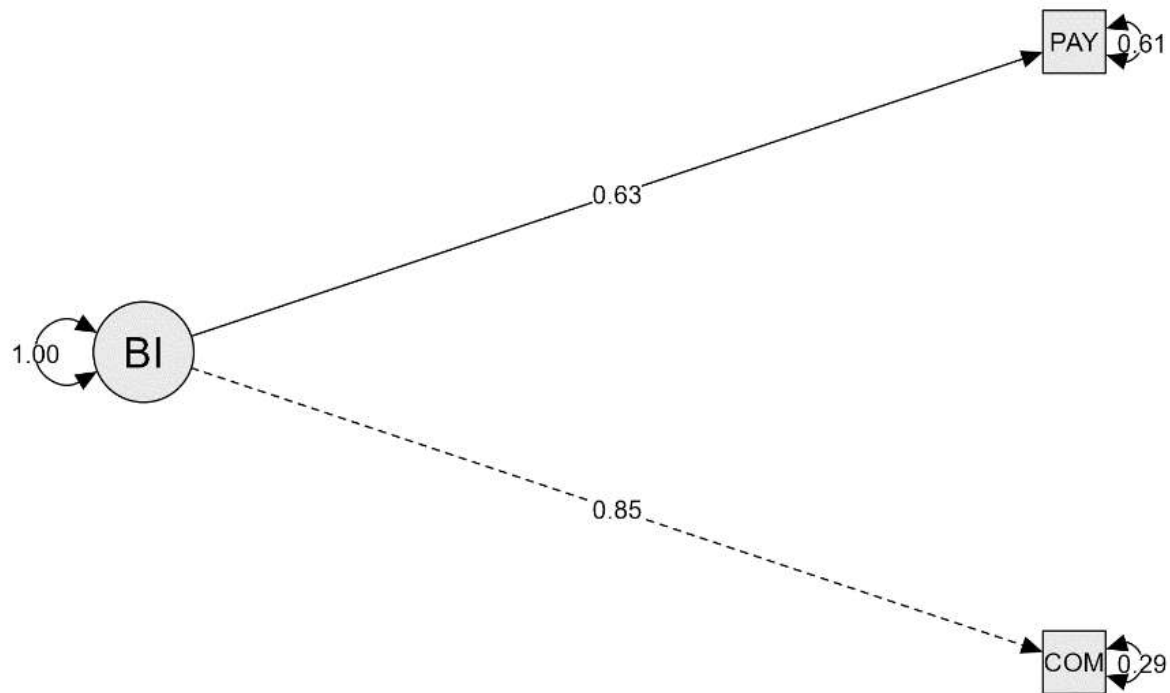


Figure 3
The Estimated Congeneric Measurement Model for BI

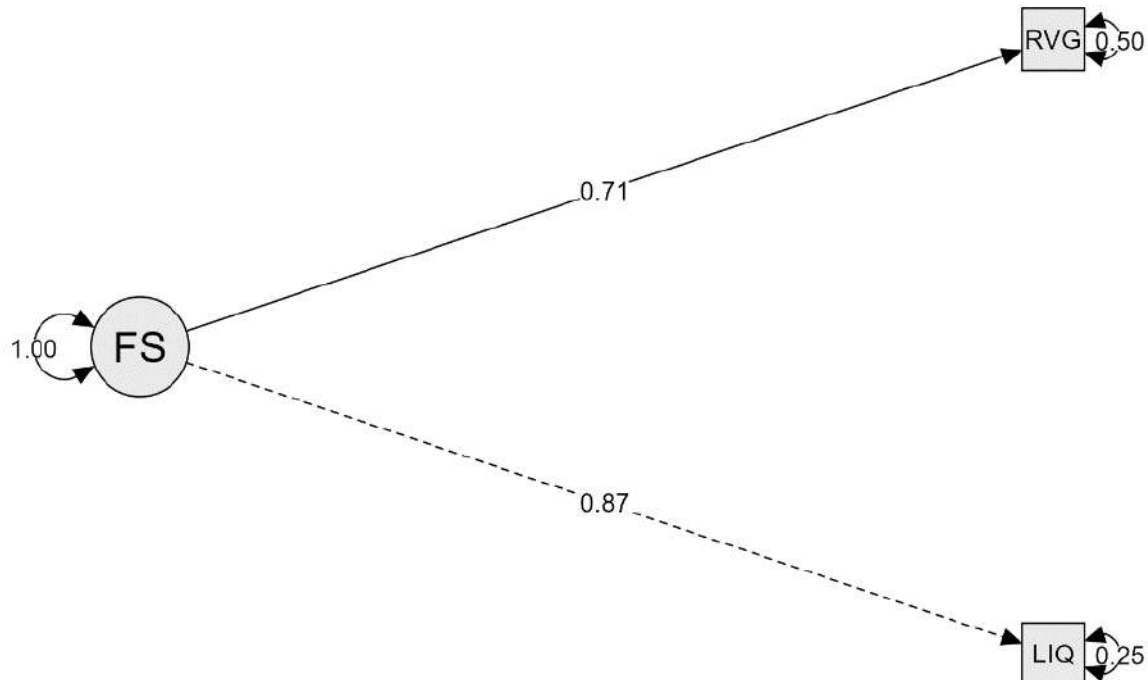


Figure 4
The Estimated Congeneric Measurement Model for FS

The financial sustainability (FS) one-factor congeneric measurement model used two parcels (revenue generation and liquidity) with equality restrictions on one factor loading. All factor loadings exceeded 0.5, and the model showed acceptable fit: $\chi^2/df = 2.102$, $p = 0.247$, CFI = 1.000, TLI = 1.000, PNFI = 0.000, RMSEA = 0.000.

4.2.2 Structural Model

As discussed in section 4.2, the structural model in SEM depicts the structural relationships between the latent constructs (Kline, 2023).

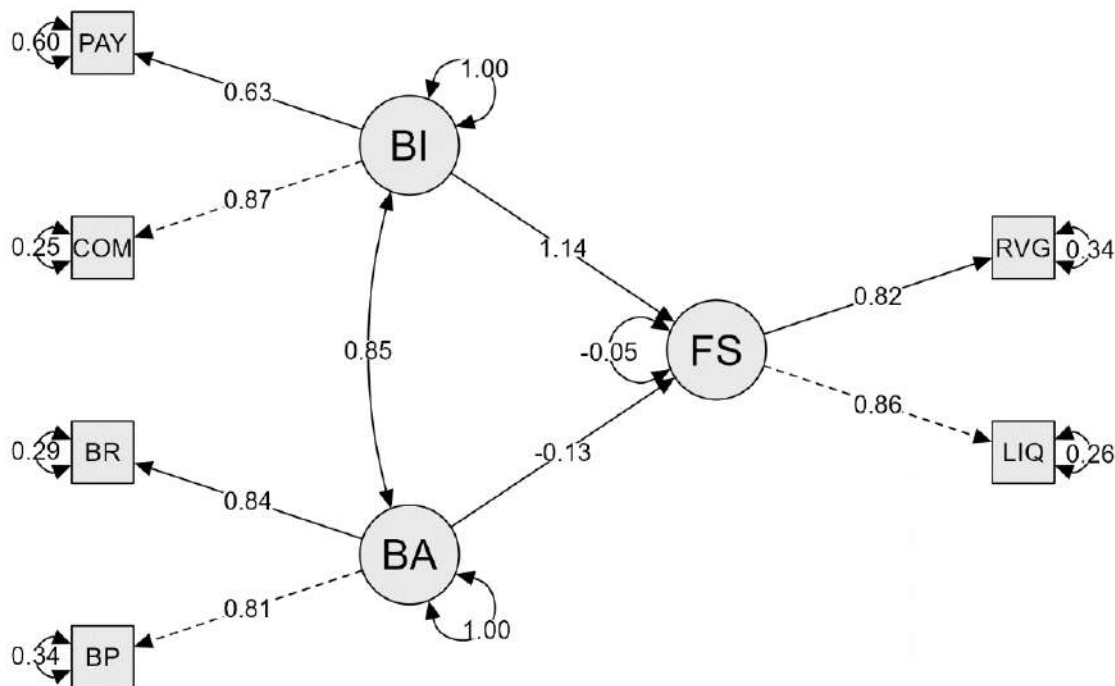


Figure 5

Structural Equation Model for Participatory Budgeting and Financial Sustainability

The results produced by Structural Equation Modelling (SEM).

The structural equation model (Figure 5) examined relationships among Budget Approval (BA), Budget Implementation (BI), and Financial Sustainability (FS), with all factor loadings exceeding 0.50 (good indicator reliability) and outstanding overall model fit, enabling structural path interpretation.

Direct Effects: The fitted structural model (Figure 5) includes residual covariance between Budget Approval (BA) and Budget Implementation (BI). Budget implementation exhibited a strong positive association with financial sustainability ($\beta = 1.14$, unstandardized), while budget approval showed a comparatively weaker relationship ($\beta = -0.13$). These findings suggest that the quality of budget execution may be more closely linked to fiscal outcomes than approval processes alone. However, because the study is based on cross-sectional data, the observed relationships should not be interpreted as conclusive evidence of causality suggesting that approval influences sustainability indirectly through implementation quality. Financial Sustainability (FS) was reliably measured by Revenue Generation (RVG, $\beta = .82$) and Liquidity (LIQ, $\beta = .86$), confirming their validity as indicators of local government fiscal health.

Model fit and overall evaluation: The comprehensive structural equation model demonstrated outstanding overall fit: CFI = 0.986, TLI = 1.000, RMSEA = 0.000, SRMR = 0.015, and a non-significant chi-square test ($\chi^2 (12) = 8.656$, $p = .732$), indicating no statistical difference between the observed and model-implied covariance matrices. These indices show the model closely matches observed covariances. The non-significant chi-square ($p = .732$) supports no general misfit, while incremental indices near 1.00 and RMSEA ≈ 0 with SRMR = 0.015 indicate an exceedingly well-fitting model. Reporting of exact (χ^2), incremental (CFI/TLI), and absolute/approximate (RMSEA, SRMR) indices follows methodological recommendations for transparent SEM reporting (Kline, 2023; Peugh & Feldon, 2020).

The Tucker–Lewis Index marginally exceeded unity (TLI = 1.000); a phenomenon occasionally observed in exceptionally well-fitting models due to sampling fluctuations. Consistent with SEM reporting conventions, values exceeding 1.00 were interpreted as indicating excellent model fit (Kline, 2023). The non-significant chi-square statistic ($\chi^2 (12) = 8.656$, $p = .732$) indicates excellent correspondence between the hypothesized model and the observed covariance matrix. Although chi-square statistics are often sensitive to sample size, the present model exhibited exceptionally strong fit across all reported indices. This finding suggests that the theoretical specification adequately captured the observed relationships without evidence of substantial model misspecification.

Moderation effects: A moderating effect occurs when a third variable alters the strength or direction of the relationship between an independent and dependent variable, indicating how a predictor's influence changes under different conditions (Hayes, 2022). In social and organizational sciences, moderation helps understand process contexts, enriching theories and revealing otherwise unnoticed variations (Aguinis et al., 2021). Moderation is studied via interaction terms in regression or SEM; a significant interaction means the predictor–outcome relationship depends on the moderator's level (Gaskin & Lim, 2021). Recent advances emphasize visualizing such interactions, as coefficients alone cannot determine moderation's nature or direction (Hayes, 2022; Memon et al., 2021).

The growing emphasis on moderation reflects recognition that behavioral and institutional processes vary across populations. Moderation increases theoretical precision, identifies boundary conditions, and helps apply findings to subgroups or contexts where interventions may be more effective (Aguinis et al., 2021). Consequently, moderation analysis has become a central tool in social science research, shifting focus from average effects to fine-grained, context-sensitive explanations. Age moderation was assessed using multi-group structural equation modelling. Respondents were classified into four age categories (18–30, 31–40, 41–50, and above 50 years). Measurement invariance was established prior to estimating group-specific structural paths. Differences across groups were evaluated using chi-square difference testing and comparison of standardized path coefficients (Kline, 2023).

Model equation for interaction terms

$$FS = \beta_1 PB + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 (PB \times D_2) + \beta_6 (PB \times D_3) + \beta_7 (PB \times D_4) + \varepsilon$$

Where:

β_1 = slope of PB on FS for the reference category (18-30)

β_5 = difference in slope (Group 2 minus Group 1): slope for Group 2 = $\beta_1 + \beta_5$

Again, Group 3 slope = $\beta_1 + \beta_6$; Group 4 slope $\beta_1 + \beta_7$

Table 6

Multi-Group SEM Moderation Results for the PB → FS Path Across Age Categories

Age Group	PB → FS (β)	SE	CR (z-value)	p-value	Interpretation
18–30	0.42	0.09	4.67	< .001	Strong positive, stat. sign. effect
31–40	0.28	0.08	3.39	< .001	Moderate positive, sign. effect
41–50	0.11	0.07	1.57	.116	Weak and non-sign. effect
50+	−0.04	0.10	−0.41	.682	No effect; direction reverses but non-significant

Measurement invariance testing, Table 7 was critical for ensuring that the model's constructs, such as PB and FS, were conceptually understood in the same way across the four age groups (18-30, 31-40, 41-50, and 50+). Without showing this baseline equivalence, any changes detected in the structural paths across age groups could have been incorrectly attributed to measurement errors rather than actual moderation effects.

Table 7

Invariance Testing for Moderation (Chi-Square Difference Test)

Model	χ^2	df	$\Delta\chi^2$	Δdf	p-value
Configural model (Same factor structure)	152.34	84	—	—	—
Metric model (Equal factor loadings)	158.02	90	5.68	6	.459
Structural path constrained (PB → FS equal across groups)	173.90	93	15.88	3	.0012

To test whether age moderates the relationship between participatory budgeting (PB) and financial sustainability (FS), a multi-group SEM was conducted (Table 6). Configural and metric invariance tests (Table 7) confirmed that the latent construct structure is similar across age groups, with configural invariance establishing that respondents interpret constructs consistently (Putnick & Bornstein, 2016; Wang & Wang, 2020). Constraining the PB–FS path to be equal across four age groups yielded a significant chi-square change ($\Delta\chi^2 (3) = 15.88$, $p = .0012$), indicating moderation by age and $\beta=0.42$ (18–30), $\beta=-0.04$ (50+) represents a substantial difference.

Group-specific path coefficients showed that the PB–FS association is strongest for ages 18–30 ($\beta = 0.42$, $p < .001$) and 31–40 ($\beta = 0.28$, $p < .001$), weaker and non-significant for ages 41–50 ($\beta = 0.11$, $p = .116$), and near zero for ages 50+ ($\beta = -0.04$, $p = .682$). Thus, PB more effectively enhances financial sustainability for younger local government employees, while the relationship is reduced or absent for older cohorts.

4.3 Discussion

The research examined age-moderated effects of participatory budgeting (PB) on financial sustainability in western Ugandan local governments. Budget approval (BA) showed a non-significant direct effect on financial sustainability ($\beta = -0.133$, $p = .445$), suggesting that consultative approval processes alone do not directly influence fiscal health (Khan, 2021; Gupta & Yadav, 2021). In contrast, budget implementation (BI) had a strong positive effect ($\beta = 1.136$, $p < .001$), highlighting that faithful execution of resources and internal controls matter more for sustainability than what is merely authorized (Abukhater, 2022; Chen & Li, 2023; Sutrisno & Widodo, 2023).

The study conceptualized financial sustainability through liquidity and revenue generation rather than the broader range of dimensions identified in the literature. This operationalization reflects the realities of Ugandan local governments, where financial sustainability is primarily determined by the ability to generate adequate revenue and maintain sufficient liquidity for service delivery. While debt management and asset maintenance are recognized components of comprehensive sustainability frameworks, their practical significance is comparatively limited in district governments due to restricted borrowing powers and data limitations. Therefore, the findings should be interpreted as reflecting financial sustainability from the perspective of fiscal resilience and resource mobilization capacity.

The absence of statistically significant participatory budgeting–financial sustainability relationships among respondents aged 41–50 and above 50 years should be interpreted cautiously. Age exerted a statistically significant moderating influence on the relationship between participatory budgeting and financial sustainability. The multi-group SEM results revealed meaningful variation across age cohorts, with the strongest positive association observed among younger respondents (18–30 years) and progressively weaker relationships among older groups. The significant chi-square difference test ($\Delta\chi^2(3) = 15.88$, $p = .0012$) indicates that age-related heterogeneity is substantively important and suggests that participatory budgeting may be experienced and interpreted differently across generations. Given the relatively modest subgroup sample sizes, it is possible that some non-significant findings reflect limited statistical power rather than a complete absence of age-related moderation effects. Future studies employing larger samples and longitudinal designs would provide more robust evidence regarding age-based heterogeneity.

The moderation findings should be interpreted within the context of the study population, which comprised both community participants and institutional actors involved in participatory budgeting. Unlike studies that focus exclusively on citizen engagement, the present analysis captures age-related differences among stakeholders responsible for designing, implementing, monitoring, and participating in budgeting processes. Consequently, the observed age effects may reflect variations in administrative behaviour, leadership approaches, experience levels, and receptiveness to participatory governance practices rather than differences in civic engagement alone. Multi-group SEM found that age moderated the PB–FS relationship only modestly; younger groups showed stronger associations, but overall, institutional factors (transparency, managerial capacity, accountability) matter more than employee age (Anessi-Pessina et al., 2022). The structural model fit well ($\chi^2 = 8.656$, $df = 12$, $p = .732$), confirming its robustness for explaining financial sustainability pathways in decentralized governance systems.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study finds that, while participatory budgeting helps to make local budgets financially sustainable, it is its implementation, rather than its approval, that is more important for this effect. The linkage between budget approval and the actual commitments, payments, revenue mobilization and service delivery seems to be more strongly tied to financial sustainability, although it is acknowledged that budget approval is an important element of participatory decision making. From this perspective, participatory budgeting is not limited to a consultative and approval process, but one that should be followed through to the implementation of the budget and the management of money.

The study also finds that participative budgeting's relation with financial sustainability is significantly influenced by the variables of age. Multi-group analysis revealed increasing positive relationships across the younger groups and increasingly null relationships across the older groups. The results of the study, however, should be interpreted with caution due to the cross-sectional design and small sample size of each age group. Overall, the results imply that institutional capacity and effective financial management (in terms of IAFT) are still more basic determinants of sustainable fiscal outcomes than demographic factors.

Last, the structural equation model serves as a helpful tool to account for the relationship between participatory budgeting and financial sustainability in terms of budget implementation and the dimensions of liquidity and revenue generation. The study thus builds the case for the need to strengthen participative budgeting and build on the three conditions (meaningful participation, effective implementation, monitoring and financial controls and resource mobilization). Future studies could look at further contextual factors, including digitalization capacity, civic engagement, institutional capacity, and the strength of internal control, to help better understand financial sustainability in decentralized local governments.

5.2 Recommendations

The study suggests that local governments should enhance their budget implementation capacity through strengthening financial planning, expenditure control, commitment management, payment systems and monitoring budget approval. The focus should be increased on making the approved priorities a reality in terms of financial and service delivery outcomes in a timely and measurable way.

Local governments should also bolster financial oversight and accountability system by enhancing their internal control, budget monitoring, transparency of resource use and regular performance evaluation. This would aid in minimizing implementation gaps and strengthening the link between participatory budgeting and financial sustainability.

The study also calls for capacity building of participatory budgeting stakeholders, such as political leaders, technical officers, civil society representatives, and community members. It should focus on participatory planning, budget analysis, financial management, monitoring and accountability.

Lastly, local governments should create age-sensitive participation pathways that can accommodate the varying communication, engagement, and technology preferences among older and younger people. Further research is needed on other possible moderators, such as digitalization capacity, quality of civic engagement, institutional capacity and internal control strength, preferably with larger samples and longitudinal designs.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

- Abukhater, H. (2022). The impact of budget implementation on financial performance: Evidence from local governments. *Journal of Public Budgeting, Accounting & Financial Management*, 34(3), 345–363.
- ACODE. (2023). *Local government scorecard report 2022/2023: Public participation and performance in Uganda's districts*. Advocates Coalition for Development and Environment.
- Agerberg, M., & Sundström, A. (2022). Youth and political participation: A global examination of determinants and consequences. *Governance*, 35(4), 1103–1120.
- Aguinis, H., Edwards, J. R., & Bradley, K. J. (2021). Improving our understanding of moderation and mediation in strategic management research. *Organizational Research Methods*, 24(3), 389–415. <https://doi.org/10.1177/1094428119852034>
- Agyemang, J., Asiedu-Appiah, F., & Aboagye, E. (2020). Public financial management and local government performance in sub-Saharan Africa. *Public Organization Review*, 20(3), 421–437.
- Ahrens, T., & Ferry, L. (2021). Financial resilience of local governments during COVID-19: Public financial management perspectives. *Public Administration Review*, 81(4), 592–597.
- Amnå, E., & Ekström, M. (2020). Young people's political participation in times of digital transformation. *Journal of Youth Studies*, 23(10), 1309–1326.
- Anessi-Pessina, E., Barbera, C., Langella, C., Manes-Rossi, F., Sancino, A., Sicilia, M., & Steccolini, I. (2022). Financial sustainability in the public sector: A synthesis of the literature. *Public Management Review*, 24(11), 1697–1722.
- Azevedo, R. R. de, Cardoso, R. L., Cunha, A. S. M. da, & Wampler, B. (2022). Participatory budgeting and budget dynamics in the public sector. *Revista de Contabilidade e Organizações*, 16, Article e193141. <https://doi.org/10.11606/issn.1982-6486.rco.2022.193141>
- Banaji, S., & Buckingham, D. (2020). Young people, digital media, and political participation: New findings. *Information, Communication & Society*, 23(2), 247–260.
- Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quinonez, H. R., & Young, S. L. (2020). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, 8, 1–18.
- Chen, Y., & Li, W. (2023). Budget execution efficiency and fiscal sustainability: The mediating role of internal control. *Sustainability*, 15(4), Article 3285.
- Creswell, J. W., & Creswell, J. D. (2022). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.

- De Simone, F., & Panzaru, C. (2022). Fiscal transparency and citizen participation: Evidence from local government reforms. *Local Government Studies*, 48(6), 1234–1253.
- Dias, N. (2020). Participatory budgeting: A global overview of practices and outcomes. *Journal of Public Deliberation*, 16(2), 1–20.
- Etikan, I., & Babatope, O. (2021). A review of random sampling techniques in research. *International Journal of Research in Medical Sciences*, 9(6), 167–173.
- Faguet, J. P., & Pöschl, C. (2022). Citizen participation and public investment outcomes: New evidence from decentralised governance. *Governance*, 35(4), 1151–1172.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Gaskin, J., & Lim, J. (2021). *Mastering AMOS for SEM: A complete guide*. Gaskination Academic Press.
- Gherghina, S. (2022). Participatory budgeting and the perception of collective efficacy: Evidence from municipalities. *Local Government Studies*, 48(6), 1071–1088.
- Gupta, P., & Yadav, S. (2021). Beyond budgetary approval: Analyzing the gap between planning and execution for urban sustainability projects. *Journal of Urban Management*, 10(2), 156–170.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). SAGE Publications.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Danks, N. (2021). *Partial least squares structural equation modeling (PLS-SEM): Using R, Minitab, and SmartPLS*. Springer.
- Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). Guilford Press.
- Henseler, J. (2020). *Composite-based structural equation modeling: Analyzing latent and emergent variables*. Guilford Press.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Khan, A. (2021). The ritual of budget approval and the reality of fiscal outcomes: A critical analysis. *Critical Perspectives on Accounting*, 78, Article 102274.
- Kayode, A., Adeyemi, T., & Olowu, D. (2021). Citizen participation and fiscal governance reforms in Africa. *International Journal of Public Administration*, 44(8), 684–695.
- Kim, S., & Lee, J. (2020). Citizen participation and the role of demographic factors in public budgeting processes. *International Journal of Public Administration*, 43(6), 495–507.
- Kivunja, C., & Nayenga, R. (2021). Youth civic participation in Africa: Digital engagement and the reconfiguration of public spheres. *African Journal of Political Science*, 15(1), 45–62.
- Kline, R. B. (2023). *Principles and practice of structural equation modeling* (5th ed.). Guilford Press.
- Lieberman, E., Posner, D., & Tsai, L. (2022). Taxation and accountability in low-capacity states. *Annual Review of Political Science*, 25, 113–132.
- Local Government Finance Commission. (2021). *Annual local government financing report 2020/2021*. Government of Uganda.
- Local Government Finance Commission. (2022). *Local government performance report 2021/2022*. Government of Uganda.
- Memon, M. A., Cheah, J.-H., Ting, H., Ramayah, T., & Chuah, F. (2021). Moderation analysis: Issues and guidelines. *Journal of Applied Structural Equation Modeling*, 5(1), 1–11.
- Ministry of Local Government. (2022). *Report on community participation in local government planning and budgeting*. Government of Uganda.
- Mombo, J., Nyongesa, A., & Oloo, M. (2022). Age, participation, and community decision-making: Evidence from local governance forums in East Africa. *Development in Practice*, 32(8), 1123–1136.
- Mosley, P., & Watson, O. (2020). Participatory governance and fiscal performance in developing countries. *Public Administration and Development*, 40(3), 149–162.
- Mugisha, F., & Kwagala, B. (2021). Citizen participation, accountability, and service delivery in Ugandan local governments. *Journal of African Public Administration and Development*, 8(2), 45–62.
- Nyawanda, B., Otieno, S., & Onkware, K. (2022). Age-related determinants of citizen participation in county budgeting processes. *Journal of African Governance*, 9(1), 21–34.
- OECD. (2020). *Innovative citizen participation and new democratic institutions: Catching the deliberative wave*. OECD Publishing.
- Office of the Auditor General. (2022). *Annual report of the Auditor General on local governments for the year ended June 2022*. Government of Uganda.



- Oyewo, B., Olaoye, C. O., & Ajetunmobi, O. (2023). Budget implementation, monitoring intensity, and financial health of non-profit organizations. *Financial Accountability & Management*. Advance online publication.
- Peugh, J., & Feldon, D. F. (2020). How well does your structural equation model fit your data? Is Marcoulides and Yuan's equivalence test the answer? *CBE—Life Sciences Education*, 19(3). <https://doi.org/10.1187/cbe.20-01-0016>
- Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting guidelines. *Developmental Review*, 41, 71–90.
- Sarstedt, M., Ringle, C. M., Cheah, J.-H., Ting, H., Moisescu, O. I., & Radomir, L. (2022). Structural model assessment in PLS-SEM: Best practice guidelines. *Industrial Management & Data Systems*, 122(12), 1–20.
- Satterthwaite, M., & Davies, T. (2023). Participatory governance, demographic diversity, and policy influence: Rethinking inclusiveness in citizen engagement. *Public Administration Review*, 83(2), 289–303.
- Schugurensky, D., & Mook, L. (2024). Participatory budgeting and local development: Impacts, challenges, and prospects. *Local Development & Society*, 5(3), 433–445. <https://doi.org/10.1080/26883597.2024.2391664>
- Sjoberg, F. M., Mellon, J., & Peixoto, T. (2023). Citizen engagement, legitimacy, and local revenue mobilisation. *World Development*, 161, Article 106113.
- Sseguya, H., Nabunnya, T., & Mwesige, P. (2023). Local government financing constraints and fiscal performance in East Africa. *African Journal of Public Affairs*, 12(1), 89–107.
- Ssemakula, E., & Twinamatsiko, F. (2020). Citizen participation, budget transparency, and service delivery in Uganda. *African Journal of Governance and Development*, 9(1), 67–84.
- Taherdoost, H. (2020). Sampling methods in research methodology: How to choose a sampling technique. *International Journal of Academic Research in Management*, 9(1), 18–27.
- Touchton, M., McNulty, S., & Wampler, B. (2023). Participatory budgeting and community development: A global perspective. *American Behavioral Scientist*, 67(4), 520–536. <https://doi.org/10.1177/00027642221086957>
- Touchton, M., & Wampler, B. (2020). Participatory budgeting and governance outcomes: A global comparative analysis. *World Development*, 129, Article 104138.
- Tumwine, S., Kaberuka, W., & Ntayi, J. (2022). Working capital management, liquidity, and financial performance in public sector entities in Uganda. *African Journal of Economic Review*, 10(3), 112–130.
- Uganda Local Governments Association. (2024). *Local government financing: Options for increasing local revenue* (Policy brief).
- Wampler, B., McNulty, S., & Touchton, M. (2021). *Participatory budgeting in global perspective*. Oxford University Press.
- Wampler, B., & Touchton, M. (2021). Scaling up participatory budgeting: Institutions, capacity, and fiscal effects. *Public Administration Review*, 81(5), 865–878.
- Wang, J., & Wang, X. (2020). *Structural equation modeling: Applications using Mplus* (2nd ed.). Wiley.
- Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2021). Sample size requirements for structural equation models: Updated recommendations. *Structural Equation Modeling*, 28(3), 482–500.
- World Bank. (2021). *Decentralisation, local financing, and service delivery: Trends and lessons from developing countries*. World Bank Publications.