Do Governance Practices Drive Product Innovation? Evidence from Agricultural Marketing Co-operative Societies in Simiyu, Tanzania

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Abstract
While governance reforms are emphasised in Tanzania's Agricultural Marketing Co-operative Societies (AMCOS), the governance–product innovation relationship remains underexplored despite its importance for competitiveness and sustainability. This study examines how governance practices influence product innovation in AMCOS in Simiyu Region, focusing on board accountability, board strategic leadership, digital governance, and inclusive governance, guided by Good Governance Theory and the Resource-Based View. A cross-sectional mixed-methods design with an embedded approach was used. Quantitative data were collected from 237 AMCOS managers using structured questionnaires, while qualitative data were obtained from District Co-operative Officers through interviews. Analysis used descriptive statistics and regression in SPSS, with qualitative data analysed thematically. Results show low product innovation, with 61.2% of AMCOS reporting no new products or services over the past three years. Regression results indicate that only board accountability has a positive and statistically significant effect on product innovation, while board strategic leadership, digital governance, and inclusive governance have statistically insignificant effects. Qualitative findings reveal that traditional business orientation, limited board capacity, dependency on external support, and a risk-intensive regulatory environment constrain innovation. The study concludes that governance practices in Simiyu AMCOS contribute little to product innovation. Accountability supports compliance and routine improvements, while other governance mechanisms do not translate into meaningful innovation due to structural and capacity limitations within a cotton-centric context. The study recommends strengthening board capacity, strategic planning systems, adopting the New Generation Co-

operative model, and regulatory policy support to foster product innovation in AMCOS.

Keywords: *Governance systems, Agricultural Co-operatives, Innovation Capacity*

INTRODUCTION

Product innovation is a key driver of organisational competitiveness, sustainability, and long-term performance, particularly within agricultural co-operatives. Across agricultural value chains, innovation enables organisations to respond to changing market demands, enhance value addition, and improve members' economic outcomes (Rwekaza & Anania, 2018). Agricultural Marketing Co-operative Societies (AMCOS), which link smallholder farmers to markets, are expected to adopt innovations that promote product diversification, processing, branding, digital integration, and inclusive service delivery (Njau et al., 2019). In developing economies such as Tanzania, where co-operatives underpin rural livelihoods and local development, product innovation is essential for competitiveness and sustainability (Ahmed, 2015; Holgado-Silva & Binotto, 2021).

Despite this importance, many agricultural co-operatives remain constrained in their transition from raw-material suppliers to value-adding enterprises (Holgado-Silva & Binotto, 2021; Rwekaza & Anania, 2018). Governance, defined as the system by which co-operatives are directed and controlled, is central to addressing this gap by aligning members' interests with organisational goals (Palacio & Oñate-Paredes, 2024). Governance mechanisms, including board accountability, strategic leadership, digital governance, and inclusive participation, shape resource allocation and innovation capacity (Silva et al., 2022). Within the Tanzanian AMCOS context and an evolving technological environment, the effectiveness of these governance mechanisms is particularly important in shaping how co-operatives translate organisational processes into innovation and participation outcomes (Njau et al., 2019). This study positions these governance mechanisms not only as performance enablers but also as drivers of product-innovation capability in co-operative organisations.

Empirical evidence on the governance–innovation relationship in agricultural co-operatives remains limited and inconsistent, particularly in developing economies (Holgado-Silva & Binotto, 2021; Jamaluddin et al., 2023). Existing studies largely focus on private-sector firms, leaving co-operatives underexplored, and tend to emphasise external factors such as finance and institutional support rather than internal governance

mechanisms like digital systems and inclusive governance that strengthen coordination and participation (Holgado-Silva & Binotto, 2021; Njau et al., 2019). Recent studies suggest that governance systems characterised by transparency, digital coordination, and inclusivity are key drivers of innovation and value creation (Guimarães et al., 2022).

Governance shapes organisational outcomes by setting strategic direction and strengthening accountability systems (Jamaluddin et al., 2023; Silva et al., 2022). In agricultural co-operatives, boards of directors serve as the central governance unit, aligning innovation with member welfare and sustainability goals (Rwekaza & Anania, 2018). However, findings remain mixed. While some studies report that board accountability, strategic leadership, digital governance, and inclusive governance enhance innovation (Fatima et al., 2026; Silva et al., 2022), others find weak effects due to limited capacity, low digital readiness, and institutional constraints (Paraschou et al., 2025). This highlights the need for context-specific analysis, particularly given the scarcity of evidence on cotton-dominated co-operative systems despite their importance to rural economies in Tanzania.

Addressing this gap, the study examines the relationship between governance practices and product innovation within AMCOS in Simiyu, Tanzania. It argues that accountability, transparency, participation, digital coordination, and internal capabilities jointly enhance innovation capacity. Accordingly, it examines how board accountability, board strategic leadership, digital governance, and inclusive governance influence product innovation, providing empirical evidence for policymakers and co-operative leaders to strengthen governance to support sustainability and innovation. Focusing on AMCOS in a cotton-dominated, contemporary digital context, the study offers novel empirical insights into how internal governance mechanisms interact to drive product innovation in resource-constrained co-operative settings, an area that remains underexplored in the literature.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Theoretical Framework: Good Governance Theory and Resource-Based View

The study was guided by Good Governance Theory (GGT) and the Resource-Based View (RBV), which together provided the analytical foundation for explaining how governance mechanisms within AMCOS influence product innovation. GGT, popularised by the World Bank,

emphasises transparency, accountability, participation, legitimacy, and professionalisation in organisational management (Diarra, & Plane, 2011; OECD, 2023; Puri & Sujarittanonta, 2016). These principles are relevant in AMCOS where members are both owners and beneficiaries, requiring democratic and accountable decision-making structures (Silva et al., 2022). In this context, accountability and participation align governance decisions with member needs, thereby improving coordination, responsiveness, and the capacity to generate product innovation.

RBV complements this view by explaining performance through valuable, rare, inimitable, and non-substitutable internal resources(Njau et al., 2019; Saani et al., 2025). In AMCOS, governance capabilities such as strategic leadership and digital governance are treated as internal strategic resources that enhance product innovation. Strategic leadership improves prioritisation of innovation activities and resource allocation, while digital governance enhances information flow, reduces asymmetry, and facilitates knowledge sharing necessary for developing new products and services (Cao et al., 2025; Cortes & Herrmann, 2021; Silva et al., 2022).The integration of GGT and RBV provides a complementary lens in which governance is viewed both as a normative system of accountability and participation and as a strategic resource base for innovation. Together, these theories explain how governance mechanisms enable AMCOS to overcome resource constraints and enhance product innovation, value addition, and competitiveness within agricultural value chains (Holgado-Silva & Binotto, 2021; Saani et al., 2025).

Empirical Literature Review and Hypothesis Development

Board Accountability and Product Innovation

Board accountability refers to the responsibility of board members for their decisions and stewardship of organisational resources (Nkilijiwa, 2026). It is recognised as a key governance mechanism influencing organisational performance and innovation(Franscis et al., 2009; Nkilijiwa, 2026). Empirical studies show that accountable boards enhance transparency, align decisions with stakeholder interests, and improve resource allocation for innovation (Akpan et al., 2022; Heubeck & Meckl, 2022; Silva et al., 2022). Monitoring and reporting further strengthen decision-making in co-operatives (Difalla et al., 2025; Franscis et al., 2009). Evidence from developing contexts also shows improved innovation capacity under strong accountability systems (Kijkasiwat, et al., 2024; Silva et al., 2022). However, limited evidence exists on how board accountability influences

product innovation in cotton-centred AMCOS in Simiyu Region, Thus, it is hypothesised that:

H₁: *Board accountability has a positive and significant effect on product innovation in AMCOS.*

Board Strategic Leadership and Product Innovation

Board strategic leadership refers to the board's ability to define vision, set priorities, and guide decisions for long-term performance (Lucas et al., 2025). It includes goal alignment, adaptive decision-making, and the chairperson's coordinating role (Cortes & Herrmann, 2021; Lucas et al., 2025). Studies show that strategic leadership enhances innovation through clear direction, experimentation, and risk-taking (Akpan et al., 2022; Cortes & Herrmann, 2021; Fatima et al., 2026). It also supports adaptation to market changes (Heubeck & Meckl, 2022; Sabourin, 2020), although findings remain mixed due to institutional constraints (Maharani et al., 2024; Mui et al., 2018). However, evidence on strategic leadership and product innovation in Simiyu AMCOS remains limited. Accordingly, it is hypothesised that;

H₂: Board strategic leadership has a positive and significant effect on product innovation in AMCOS.

Digital governance and Product Innovation

Digital governance refers to the use of digital technologies and information systems to improve decision-making, transparency, and coordination (Hanisch et al., 2023). It includes MIS, e-transactions, and digital communication platforms that enhance information flow and timely decisions (Du et al., 2025). Evidence shows that digital governance improves access to information, coordination, and data-driven innovation (Cook et al., 2022; Dawson et al., 2024). MIS improves monitoring, while e-transactions enhance efficiency and transparency (Al-Shakri et al., 2024; Hera et al., 2024). Digital platforms also strengthen collaboration and responsiveness (Alassuli et al., 2025; Oppusunggu et al., 2024). Empirical work on digital governance within AMCOS operating in Simiyu's cotton sector is still scarce, thus it is hypothesised that:

H₃: *Digital governance has a positive and significant effect on product innovation in AMCOS*

Inclusive Governance and Product Innovation

Inclusive governance entails participatory decision-making and the representation of diverse members' interests in co-operative management (Annahar et al., 2022). It encompasses inclusive leadership and equitable

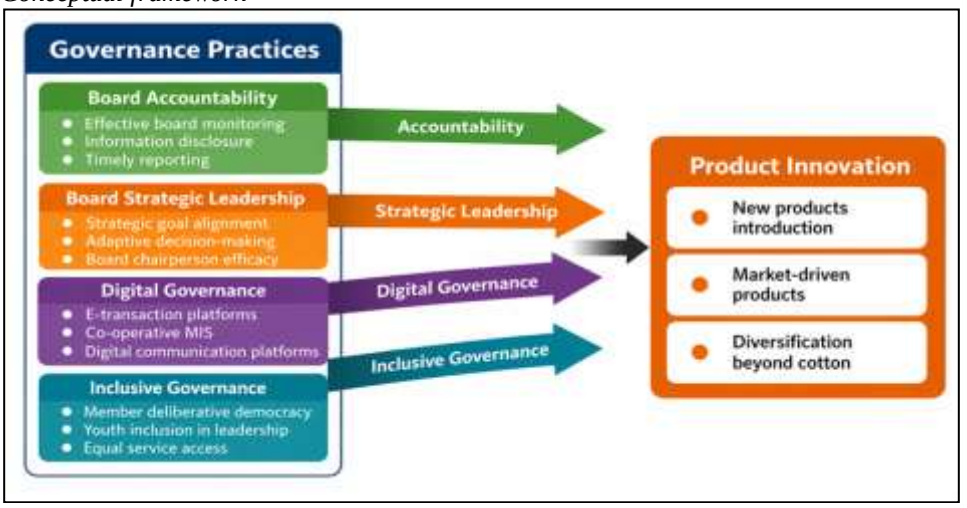
access to resources (Annahar et al., 2022; Buang, 2021). Studies indicate that participation enhances knowledge sharing, problem-solving, and innovation (Peng et al., 2016; Richter, 2018). Inclusion of diverse members, particularly youth, fosters new ideas and innovation (Li & Tang, 2022). However, participation may slow decision-making due to conflicts and institutional constraints (Chevallier, 2011; Hale, & Carolan, 2018). Nevertheless, empirical evidence on how inclusive governance affects innovation in Simiyu Region AMCOS remains limited. Thus, it is hypothesised that:

H₄: *Inclusive governance has a positive and significant effect on product innovation in AMCOS.*

Conceptual Framework

Figure 1 presents a conceptual framework illustrating the relationship between governance practices and product innovation in AMCOS. Grounded in the study's theories and empirical literature, the framework posits that board accountability, board strategic leadership, digital governance, and inclusive governance influence product innovation performance within co-operatives. In AMCOS, these governance mechanisms are expected to enhance organisational capabilities reflected in new products, market-driven responses, and diversification beyond cotton-based activities, thereby strengthening product innovation in agricultural co-operatives in Tanzania

Figure 1:
Conceptual framework



Source: Developed by the Researchers from the literature

METHODOLOGY

Research design and study area

A cross-sectional mixed-methods design with an embedded approach was used, in which quantitative data served as the primary strand and qualitative data provided contextual explanation and triangulation (Creswell & Plano Clark, 2017). Data were collected at a single point in time (Cvetkovic-Vega et al., 2021), enabling assessment of relationships between governance practices and product innovation in AMCOS (Maxwell et al., 2008). The design aligns with pragmatism, as it supports mixed-method inquiry focused on practical, real-world solutions in co-operative governance (Creswell & Plano Clark, 2017).

The study was conducted in the Simiyu Region, northern Tanzania, southeast of Lake Victoria, which was purposively selected due to its high concentration of AMCOS. According to the Tanzania Co-operative Development Commission (TCDC, 2023) the region has 336 registered AMCOS across six councils: Bariadi Town (25), Bariadi (50), Busega (46), Maswa (83), Itilima (58), and Meatu (74). Most AMCOS are engaged in cotton production and marketing, making the region suitable for examining how governance practices influence product innovation in agricultural co-operatives.

Sample and data collection

The sampling frame comprised all AMCOS managers and District Co-operative Officers (DCOs) in the Simiyu Region. For AMCOS managers, the population was stratified into six districts. Stratified random sampling was then used to select AMCOS managers, with one manager chosen from each AMCOS based on governance and operational experience. The sample size for each stratum was determined using the Yamane (1967) formula at a 95% confidence level and 5% margin of error. From this, respondents were randomly selected to minimise bias and ensure representativeness. The final sample consisted of 288 AMCOS managers, as presented in Table 1. Purposive sampling was used to select six DCOs as key informants, one from each district, based on their regulatory oversight role.

Table 1:
Distribution of the Sample Size fo AMCOS Managers

N.	Stratum	Target Population (AMCOS/ Managers)	Calculations (Yamane formula)	Sample Size
1.	Bariadi Town	25	$25/\{1+[25](0.05)^2\}$	23
2.	Bariadi DC	50	$50/\{1+[50](0.05)^2\}$	44
3.	Busega DC	46	$46/\{1+[46](0.05)^2\}$	41
4.	Itilima DC	58	$58/\{1+[58](0.05)^2\}$	50
5.	Maswa DC	83	$83/\{1+[83](0.05)^2\}$	68
6.	Meatu DC	74	$74/\{1+[74](0.05)^2\}$	62
	Total	**336**		**288**

Source: TCDC (2023)

Data Collection and Tool

Data were collected between June 1 and August 10, 2025, using structured questionnaires administered to AMCOS managers in the Simiyu Region and a key informant interview guide for DCOs. The questionnaire included both closed and open-ended items, with closed questions measured on a five-point Likert scale to capture respondents' views on governance practices and product innovation indicators. This approach enabled systematic measurement of study variables, particularly perceptions of governance practices within AMCOS (Tanujaya et al., 2022). Questionnaires were used for their efficiency and suitability for collecting standardised data from a large, geographically dispersed sample (Kuphanga, 2024).

Prior to the main study, the instrument was pretested with 15 AMCOS managers in Kishapu District, and necessary revisions were made to improve clarity and content validity. Reliability was assessed using Cronbach's alpha, and all constructs exceeded the acceptable threshold of 0.70, indicating satisfactory internal consistency for regression analysis. Of the 288 distributed questionnaires, 237 were returned and deemed usable, yielding an 82% response rate, which is considered adequate for statistical analysis in survey-based studies (Kelley et al., 2003).

Ethical Consideration and informed Consent

This study received ethical approval from the Board of Postgraduate Studies at The Co-operative University of Kenya (CUK) and the Tanzania Commission for Science and Technology (COSTECH) under reference number CST00001362-2025-2025-00655, ensuring compliance with ethical standards for research involving human participants. Additional

authorisation was obtained from relevant regional authorities, including the Regional Assistant Registrar, to ensure institutional recognition and compliance with national research regulations in Tanzania.

Written informed consent was obtained from all participants before data collection, and the questionnaire clearly outlined the study's academic purpose, confidentiality safeguards, and the voluntary nature of participation. All research procedures were reviewed by COSTECH in accordance with established ethical principles for research involving human participants, ensuring that respondents were fully informed of their rights and that all data were used strictly for academic purposes.

Variable Measurement

The measurement framework was developed from relevant theoretical and empirical literature to ensure valid operationalisation of all constructs. Survey items were adapted to the AMCOS context in Tanzania to enhance clarity and relevance (Appendix 1). Responses were measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). In addition, product innovation was measured using a five-point extent scale ranging from 1 (very small extent) to 5 (very large extent) to capture the degree of innovation in terms of product diversification within AMCOS.

Board accountability was measured using indicators of board monitoring, information disclosure, and timely reporting (Evans, 2010; Joannides et al., 2016; Othman et al., 2016; Silva et al., 2022; Wuryani & Harti, 2020). Board strategic leadership was assessed through strategic goal alignment, adaptive decision-making, and chairperson effectiveness (Asahak et al., 2018; Gill et al., 2005). Digital governance was measured using e-transaction platforms, co-operative Management Information Systems (MUVU), and digital communication tools (Afridi et al., 2023; Cao et al., 2025; Gao, 2023; Moore & Benbasat, 1991). Inclusive governance was captured through member participation, youth inclusion in leadership, and equitable access to services (Hartley, 2014; Merlini et al., 2025; Novkovic, 2021). Product innovation (PI) was conceptualised as the ability of AMCOS to develop, introduce, and diversify products in response to market demand. In this study, the construct was operationalised using three indicators: new product introduction, market-driven product development, and diversification beyond cotton (Laosirihongthong et al., 2014; Maydeu-Olivares & Lado, 2003).These measurement items are summarised in Appendix 1.

Data analysis and model specification

Quantitative data from closed-ended questionnaires were analysed using descriptive and inferential statistics, with multiple linear regression employed to examine the relationship between governance practices and product innovation in AMCOS. Qualitative data from interviews and open-ended responses were thematically analysed using Microsoft Excel. Prior to regression analysis, data coding, computation, and hypothesis testing were conducted using SPSS version 28, which facilitated regression estimation, ANOVA decomposition, and diagnostic testing,

Reliability of constructs was assessed using Cronbach's alpha (α) to ensure internal consistency, as presented in Table 2. All constructs recorded acceptable to excellent reliability ($\alpha \geq 0.70$), indicating that the measurement items consistently captured the intended variables.

Table 2:
Cronbach's alpha results

Construct	No. of Items	Cronbach Alpha(α)	Remarks
Board Accountability (BA)	9	0.845	Good Reliability
Board Strategic Leadership (BSL)	9	0.788	Acceptable Reliability
Digital Governance (DG)	9	0.701	Acceptable Reliability
Inclusive Governance (IG)	9	0.753	Acceptable Reliability
Product Innovation (PI)	3	0.911	Excellent Reliability

Source: Researcher Computation

Descriptive statistics (mean and standard deviation) were used to summarise variable distributions. Diagnostic tests ensured regression assumptions were met: multicollinearity (VIF and tolerance), heteroscedasticity (Breusch–Pagan), model specification (Ramsey RESET), and residual normality (Jarque–Bera and histogram analysis). These procedures confirmed the suitability of the data for robust regression analysis. The relationships between the variables were estimated using the following regression model:

$$PI = \beta_o + \beta_1 BA_i + \beta_2 BSL_i + \beta_3 DG_i + \beta_4 IG_i + \varepsilon_i$$

Where:
PI = Product Innovation in AMCOS
β0 = Constant Coefficient (intercept)

β1-β4 = Coefficient of Independent Variables
BA = Board Accountability
BSL = Board Strategic Leadership
DG = Digital Governance
IG = Inclusive Governance
εi = error term

RESULTS

Demographic Profile of Respondents

The results in Table 3 show that, of 237 respondents, 88.2% were male and 11.8% were female, indicating strong male dominance in AMCOS management and the underrepresentation of women due to persistent gender norms and imbalance (Achandi et al., 2023). In terms of age distribution, most respondents were between 31 and 40 years (41.8%) and between 41 and 50 years (28.3%), suggesting a relatively mature workforce operating within productive working ages, which supports stability in AMCOS operations (Okumu & Mchapondwa, 2020). Regarding education levels, the majority had primary education (45.1%) and secondary education (44.3%), indicating relatively low levels of formal education, which may influence the adoption of governance practices and product innovation. Finally, work experience findings reveal that most respondents had 1–5 years (64.1%) and 6–10 years (22.4%) of experience, suggesting a moderately experienced workforce with practical exposure that can support co-operative stability and innovation activities (Berge et al., 2021).

Table 3:
Respondents' Demographic Characteristics

Demographic	Category	Frequency (n=237)	Percentage%
Gender	Male	209	88.2%
	Female	28	11.8%
Age	18-30yrs	31	13.1%
	31-40yrs	99	41.8%
	41-50yrs	67	28.3%
	51-60yrs	30	12.7%
	Above 60yrs	10	4.2%
Education	Primary	107	45.1%
	Secondary	105	44.3%
	Certificate	9	3.8%
	Diploma	4	1.7%
	Bachelor Degree	12	5.1%
Work Experience	Below 1yr	12	5.1%
	1-5yrs	152	64.1%
	6-10yrs	53	22.4%

11-15yrs	10	4.2%
16-20yrs	4	1.7%
21yrs and above	6	2.5%

Source: Field Data (2025)

Descriptive Analysis

Descriptive statistics summarised product innovation and governance practices among AMCOSs, including reporting frequency, mean, and standard deviation, prior to regression analysis. Product innovation was operationalised as a composite construct measured through three indicators: introduction of new products/services, responsiveness to market and member needs, and diversification beyond core products. While Table 4 presents descriptive results on new product introduction as a key observable dimension, the regression analysis utilised the aggregated index capturing the broader construct of product innovation. The results in Table 4 indicate that product innovation was generally low over the past three years. The majority of respondents, 145 (61.2%), reported that their AMCOS had not introduced any new products or services, reflecting limited innovation and continued reliance on traditional cotton production, collection, and marketing activities. A smaller proportion reported some level of innovation, with 39 (16.5%) indicating one new product or service, 30 (12.6%) reporting two, 18 (7.5%) reporting three, and only 5 (2.2%) reporting four or more. Overall, the findings suggest low innovation capacity among most AMCOS, with minimal diversification beyond cotton and limited uptake of new products or services.

Table 4:
AMCOS Product Innovations

Response		N	Marginal Percentage
To what extent has your AMCOS introduced new products or services over the past 3 years? (Eg; improved seeds, fertilisers, storage facilities, diversification into non-cotton crops, value-added services like grading and packaging)	None	145	61.2%
	One	39	16.5%
	Two	30	12.6%
	Three	18	7.5%
	Four or More	5	2.2%
Valid		237	100.0%

Source: Field Data (2025)

Table 5 presents descriptive results on governance practices and product innovation among 237 AMCOS respondents. Board accountability recorded a high mean score (M = 4.48, SD = 0.49), followed by inclusive

governance (M = 4.48, SD = 0.69), board strategic leadership (M = 4.31, SD = 0.54), and digital governance (M = 4.22, SD = 0.60), indicating generally strong governance perceptions across co-operatives. The relatively low to moderate standard deviations suggest limited variation in responses. In contrast, product innovation recorded a lower mean (M = 2.67, SD = 1.27), with higher dispersion, indicating substantial differences in innovation levels among AMCOS. Overall, governance practices were consistently rated highly, while product innovation remained comparatively low and uneven across co-operatives.

Table 5:
Descriptive Analysis of Governance Practices and Product Innovations

Variables	N	Mean	Std. Deviation
Board Accountability	237	4.48	0.49
Board Strategic Leadership	237	4.31	0.54
Digital Governance	237	4.22	0.60
Inclusive Governance	237	4.48	0.69
Product innovation	237	2.67	1.27

Source: Field Data (2025)

Diagnostic Test

Diagnostic tests were conducted to assess whether the regression model met the key assumptions for reliable estimation of the relationship between governance practices and product innovation.

Multicollinearity was assessed using VIF and tolerance values (Table 6). Following Hair et al. (2019) and O'Brien (2007), VIF values below 10 and tolerance above 0.10 indicated no serious multicollinearity problem. The results showed low VIF values (1.31–1.74), confirming that the governance variables (BA, BSL, DG, IG) were not highly correlated and could independently explain variation in product innovation.

Table 6:
Multicollinearity Test

Variable	VIF	1/VIF
Board Strategic Leadership	1.74	0.57394
Board Accountability	1.61	0.622863
Digital Governance	1.39	0.720854
Inclusive Governance	1.31	0.760961
Mean VIF	1.51	

Source: Field Data (2025)

Therefore, multicollinearity was not a concern (Kim, 2019). Table 6 presents the multicollinearity results, confirming independence among the governance predictors used to explain product innovation.

Table 7 reports the Breusch–Pagan test for heteroscedasticity. The chi-square value of 2.01 with p = 0.1560 indicated homoscedasticity (Breusch & Pagan, 1979), as the p-value exceeded 0.05 and the null hypothesis of constant variance was not rejected. This confirmed that the error terms had a stable variance across observations, ensuring reliable standard errors when estimating the relationship between governance practices and product innovation.

Table 7:
Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity

Null Hypothesis:	**No Heteroscedasticity issues**
chi2(1) =	2.01
Prob > chi2 =	0.1560

Source: Field Data (2025)

Table 8 presents the Ramsey RESET test results. The chi-square value of 0.12 with p = 0.9490 indicated no specification errors (Ramsey, 1969), as the p-value was far above 0.05, meaning the null hypothesis of correct model specification was not rejected. This confirmed that the functional form was appropriate and that the governance–innovation relationship was correctly modelled.

Table 8:
Ramsey RESET Test

Null Hypothesis:	**Model has no Omitted Variables**
chi2(1) =	0.12
Prob > chi2 =	0.9490

Source: Field Data (2025)

The Jarque–Bera test was used to assess residual normality, together with a visual inspection of the histogram (Table 9 and Figure 2). The test produced a chi-square value of 4.021 with a p-value of 0.1339, which exceeded 0.05, indicating that the null hypothesis of normality was not rejected (Jarque & Bera, 1987). This was supported by Figure 2, where the residuals appeared approximately bell-shaped and symmetric, with most values concentrated around the centre and fewer in the tails, closely following the normal curve. Overall, both statistical and graphical evidence

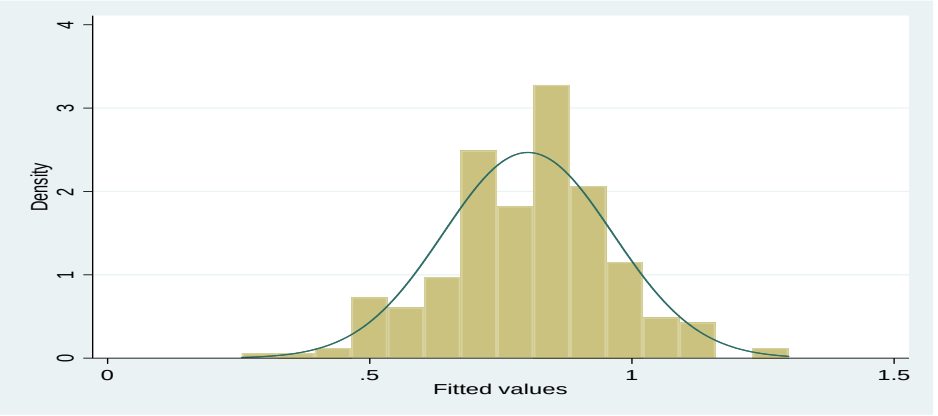
confirmed that the residuals were approximately normally distributed, supporting valid inference for the governance–product innovation model.

Table 9:
Jarque-Bera Normality Test

Test	Chi-square (χ^2)	df	p-value
Jarque-Bera	4.021	2	0.1339

Source: Field Data (2025)

Figure 2:
Histogram of the Residue Normality Test



Source: Field Data (2025)

Regression and Qualitative Results

Multiple regression analysis examined the relationship between governance practices and product innovation among AMCOS in the Simiyu Region. Quantitative findings were complemented by embedded qualitative evidence from KIIs and open-ended responses, which were analysed thematically to explain the statistical results. As presented in Table 10, the model was estimated using 237 observations, providing an adequate sample for statistical inference. The overall regression results showed that the model was statistically significant (F = 61.86, p = 0.000), indicating that board accountability (BA), board strategic leadership (BSL), digital governance (DG), and inclusive governance (IG) jointly explained variation in product innovation.

Table 10:
Model fit Measures

					Overall Model Test			
Model	**R**	**R^2**	**Adjusted R^2**	**RMSE**	**F**	**df1**	**df2**	**p**
1	0.718[a]	0.516	0.504	1.246	61.86	4	232	0.000

a. Predictors: (Constant), BA, BSL, DG, IG
Note. Models estimated using a sample size of N=237

Table 11: ANOVA[a]

	Sum of Squares	df	Mean Square	F	p
Regression.	384.00	4	96.00.	61.86	0.000
Residuals	360.19	232	1.55		
Total	744.19	236			

ı. Dependent Variable: Product Innovation
›. Predictors: (Constant), BA, BSL, DG, IG

Table 12: Regression Coefficients[a]

Predictor	Estimate	SE	t	p
Constant	-0.742	0.310	-2.39	0.018
Board Accountability (BA)	0.378	0.190	1.99	0.048**
Board Strategic Leadership (BSL)	0.027	0.203	0.13	0.893
Digital Governance (DG)	0.038	0.151	0.25	0.801
Inclusive Governance (IG)	0.088	0.145	0.61	0.544

a. Dependent Variable: Product Innovation

The model produced an R-squared (R^2) of 0.516, indicating that 51.6% of the variation in product innovation among the surveyed AMCOS is explained by the governance variables included in the model, while the remaining 48.4% is attributable to other factors not captured in the analysis. The Root Mean Squared Error (RMSE) of 1.246 indicated the average magnitude of residual errors, suggesting reasonable predictive accuracy.

The ANOVA results in Table 11 reinforce the model findings, showing that the regression component accounted for a sum of squares of 384.00 out of the total variation of 744.19, confirming that the governance variables collectively provide a statistically significant explanation of product innovation.

The regression coefficients in Table 12 show that the constant term was statistically significant ($\beta = -0.742$, $p = 0.018$), representing the baseline

predicted level of product innovation when all governance variables were held at zero. The negative coefficient suggests that, in the absence of governance practices, the model predicts a lower level of product innovation.

The results in Table 12 further indicate that board accountability (BA) was the only predictor with a statistically significant positive effect on product innovation ($\beta = 0.378$, $p = 0.048$). This implies that a one-unit increase in board accountability is associated with a 0.378 increase in product innovation, holding other governance variables constant. In practical terms, stronger accountability mechanisms such as transparent reporting, effective monitoring, and timely reporting contribute to improved innovation outcomes, including the introduction of new products, responsiveness to member and market needs, and diversification of co-operative activities beyond core products.

Qualitative evidence from KIIs supported these findings by indicating that accountable boards enhance transparency, strengthen member trust, and improve resource management within AMCOS. These governance practices were perceived as important for supporting co-operative initiatives and enabling the development of new services and business opportunities. As one DCO explained:

> *Accountability ensures proper use of every shilling, reduces misuse of funds, and builds a surplus that enables value addition and new member services beyond raw cotton* (KII-6)

These findings imply that strengthening board accountability is not merely an administrative requirement but a strategic driver of innovation in AMCOS, as it converts governance discipline into tangible capacity for resource mobilisation, value addition, and diversification beyond traditional cotton-based activities.

The regression results in Table 12 also indicated that board strategic leadership (BSL) had a positive but statistically insignificant effect on product innovation ($\beta = 0.027$, $p = 0.893$). This suggests that variations in strategic leadership among AMCOS do not significantly explain differences in product innovation, as existing planning and leadership practices do not consistently translate into product development or diversification activities.

Qualitative evidence confirmed these findings, revealing that strategic leadership is constrained by both structural and capacity-related factors. AMCOS were reported to operate under a traditional cotton marketing model, which limits financial flexibility for innovation, as one respondent noted:

> *"Many AMCOS still operate under traditional cotton marketing routines, focusing mainly on crop collection and transport. This traditional business orientation creates financial constraints that limit the board's ability to strategically pursue product innovation and diversification."* (KII-6).

In addition, limited strategic planning capacity among board members and managers results in reliance on yearly budgets rather than medium- or long-term strategic plans, creating dependence on external guidance that limits innovation initiatives, as explained by another respondent:

> *"Limited strategic planning capacity among board members and managers creates dependence on external guidance, as most AMCOS lack medium- or long-term strategic plans and rely on yearly budgets for implementation, which limits their ability to pursue product innovation independently."* (KII-3).

These findings imply that in AMCOS, strategic leadership exists in form but not in function, as structural constraints and limited planning capacity neutralise its potential to drive product innovation.

The regression results indicated that digital governance (DG) had a positive but statistically insignificant effect on product innovation ($\beta = 0.038$, $p = 0.801$), suggesting a weak direct relationship with product innovation within AMCOS. Qualitative evidence from KIIs, reinforced by additional comments, emphasised that digital governance in AMCOS remains largely compliance and reporting oriented rather than innovation driven. As one respondent noted, *"Most AMCOS use digital systems mainly for recording deliveries, payments, budgeting, not for developing new product, and digital tools help us manage members, but they do not guide on what new products to produce* (KII-1)." This suggests that technology use remains anchored in operational administrative control. Another explained that *"Managerial capacity and resource limitations make it difficult for AMCOS to use digital platforms beyond routine operations"* (KII-6), highlighting that both skills and infrastructure constraints restrict more advanced use. Overall, these results suggest that digital governance in AMCOS remains at an administrative adoption stage, where digital tools

are used mainly for routine record-keeping, constrained by limited capacity and resources, and reinforcing existing cotton-marketing practices rather than driving product innovation or strategic transformation.

Inclusive governance (IG) exhibited a positive but statistically insignificant relationship with product innovation ($\beta = 0.088$, $p = 0.544$), indicating that practices such as member deliberative democracy, youth inclusion, and equal access enhance participation, transparency, and cohesion but do not translate into product innovation. Qualitative findings from KIIs explained this gap through structural constraints, including misalignment between youth interests and the traditional cotton-focused business model, which limited the uptake of new ideas despite youth involvement. Limited board and managerial capacity further weakened the conversion of participatory inputs into innovation decisions. This was found to be reinforced by a risk-intensive regulatory environment that discouraged experimentation due to potential legal and financial consequences. As noted in open-ended questionnaire responses, "*if a new project makes a loss, managers and board members are legally required to pay,"* reflecting a risk-averse context that constrains the translation of inclusive governance into product innovation.

Overall, these results indicate that board accountability is the primary driver of product innovation, primarily focusing on strengthening compliance rather than driving transformation. The statistical insignificance of strategic leadership, digital governance, and inclusive governance reflects structural neutralisation rather than irrelevance. The cotton-based model, strict regulations, and limited managerial and board capacity restrict innovation. The negative constant indicates a low baseline, while the 48.4% unexplained variation reflects external dependencies and capacity gaps, limiting the effectiveness of governance in promoting innovation.

In summary, the estimated multiple regression equation for this model is derived as follows:

$$PI = -0.742 + 0.378(BA) + 0.027(BSL) + 0.038(DG) + 0.088(IG) + \varepsilon_i$$

Table 13:
Summary outcomes from the hypothesis tested

Hypothesis	Results	Decision
H_1: Board accountability has a positive and significant effect on product innovation within AMCOS	Reject H_0	Results support the hypothesis
H_2: Board strategic leadership has a positive and significant effect on product innovation within AMCOS	Do not reject H_0	Results do not support the hypothesis
H_3: Digital governance has a positive and significant effect on product innovation within AMCOS	Do not reject H_0	Results do not support the hypothesis
H_4: Inclusive governance has a positive and significant effect on product innovation within AMCOS	Do not reject H_0	Results do not support the hypothesis

DISCUSSION

The study examined governance practices and product innovation in AMCOS in the Simiyu Region, Tanzania. Descriptive results showed low levels of innovation, with 61.2% of respondents reporting no new products or services over the past three years. Regression results indicated that board accountability had a positive and statistically significant effect on product innovation, whereas board strategic leadership, digital governance, and inclusive governance had positive but statistically insignificant effects. Qualitative findings revealed that a cotton-based operational model, limited managerial and board capacity, administrative use of digital systems, and a risk-intensive regulatory environment constrained diversification and innovation within AMCOS.

The positive and significant effect of board accountability on product innovation is consistent with prior studies showing that accountable governance improves innovation outcomes (Akpan et al., 2022; Heubeck & Meckl, 2022; Silva et al., 2022). Effective boards enhance transparency, align decisions with stakeholders' interests, and allocate resources strategically to support innovation (Akpan et al., 2022). In agricultural co-operatives, monitoring and timely reporting strengthen resource mobilisation and facilitate new product development (Kijkasiwat, et al., 2024; Nkilijiwa, 2026). This finding supports Governance Theory, which emphasises oversight and accountability, and the Resource-Based View, which links governance mechanisms to effective resource utilisation for

innovation. In the Simiyu context, strong accountability practices appear to provide institutional legitimacy that enables AMCOS to mobilise resources and pursue innovation despite regulatory and structural constraints (Kempner-Moreira et al., 2020).

The finding that board strategic leadership has a positive but statistically insignificant relationship with product innovation suggests that, although boards provide strategic direction, it is not strong enough to generate measurable innovation in AMCOS. These results are consistent with studies indicating that strategic leadership does not directly influence innovation and that its effectiveness depends on contextual factors such as organisational capacity, governance structures, and institutional environments (Maharani et al., 2024; Mui et al., 2018). This contrasts with contexts where strategic leadership directly drives innovation (Akpan et al., 2022; Cortes & Herrmann, 2021; Heubeck & Meckl, 2022). The weak effect is explained by structural constraints in AMCOS, where a traditional cotton-centric business model limits diversification and reinforces routine operations (Lucas et al., 2025; Mui et al., 2018). Limited board and management capacity further reduces the ability to implement strategic initiatives (Littunen et al., 2021).

The regression results indicated that digital governance (DG) had a positive but statistically insignificant effect on product innovation ($\beta = 0.038$, $p = 0.801$), suggesting a weak direct relationship within AMCOS. This finding aligns with Lokuge et al. (2019) and Wang et al. (2025), who show that digital governance contributes to innovation only when supported by strong technological capacity and organisational readiness. In Simiyu AMCOS, qualitative evidence indicates that digital systems are mainly used for compliance and routine reporting, with limited application to innovation processes. Constraints related to managerial capacity, skills, and infrastructure further limit advanced use. This contrasts with studies where digital governance significantly enhances innovation under well-developed digital infrastructure and integration (Cook et al., 2022; Du et al., 2025; Hanisch et al., 2023; Hera et al., 2024), suggesting that its impact remains conditional on organisational capacity.

The results show that inclusive governance has a positive but statistically insignificant effect on product innovation, indicating that participation in decision-making does not translate into innovation outcomes in Simiyu AMCOS. This gap is explained by structural constraints, where weak board and managerial capacity limit the conversion of member inputs into viable

innovations, consistent with Ostrom, (2019) and Avoyan, (2022), who emphasise that participation requires supportive institutional design and incentives. In addition, Bijman & Wijers (2019) note that inclusiveness may create tensions between representation and market responsiveness, as evidenced by AMCOS cotton-oriented model, which restricts flexibility in innovation. Qualitative evidence further shows that youth ideas are often misaligned with existing operations, while a risk-intensive regulatory environment discourages experimentation due to potential financial and legal liability (Truby et al., 2022). Overall, inclusion enhances participation but remains insufficient to drive product innovation under current institutional conditions.

CONCLUSION AND RECOMMENDATION

The study concludes that governance practices in Simiyu AMCOS contribute only marginally to product innovation. While accountability is the only significant predictor, its role appears largely compliance-oriented within a regulated environment rather than strongly innovation-driven. The non-significant effects of strategic leadership, digital governance, and inclusive governance suggest that these mechanisms have limited influence on innovation, likely due to constraints in managerial capacity, strategic autonomy, and the cotton-centric operational model. Additionally, a risk-intensive regulatory environment discourages experimentation with innovative ideas because of potential financial and legal consequences. With a relatively low baseline level of innovation, AMCOS appear more oriented towards maintaining routine operations, which may limit opportunities for experimentation and broader organisational development.

The study recommends that the Ministry of Agriculture and the Tanzania Co-operative Development Commission (TCDC) consider moving from a strict oversight approach to a more supportive regulatory framework that encourages innovation and performance. AMCOS may adopt the New Generation Co-operative model to better align member ownership with market demand and production delivery, thereby reducing reliance on traditional cotton levies. This transition should be supported by strengthening technical capacity for board eligibility, introducing medium- to long-term strategic business plans to guide diversification, and promoting market-oriented partnerships with the private sector. By enhancing capacity-based accountability alongside these reforms, Simiyu's co-operatives can gradually evolve from government-dependent service entities into more autonomous and innovation-oriented agribusinesses.

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Appendix 1: Measurement of variables

Variable	Indicators	Measurement item	Source
Board Accountability	Effective board monitoring	The board monitors management through reports and meetings.	(Evans, 2010; Joannides et al., 2016; Othman et al., 2016; Silva et al., 2022; Wuryani & Harti, 2020)
		The board ensures annual external audits are conducted.	
		The board acts on members' concerns regarding mismanagement.	
	Information Disclosure	The board shares financial information with members.	
		The board informs members about major AMCOS decisions.	
		Members can access financial and operational reports easily.	
	Timely Reporting	Audited financial reports are presented at the AGM.	
		The board discloses information in a timely manner.	
		Members are regularly updated on AMCOS performance.	
Board strategic leadership	Strategic- goal alignment	The board aligns long-term goals with the strategic plan.	(Asahak et al., 2018; Gill et al., 2005)
		The board adjusts strategies to benefit members.	
		Resources are allocated strategically to support goals.	
	Adaptive decision making	The board aligns long-term goals with the strategic plan.	
		Plans are adjusted based on members' needs.	

		Resources are reallocated to improve efficiency.	
	Board chairperson efficacy	The chairperson promotes board engagement.	
		The chairperson sets agendas and guides product innovation	
		The chairperson ensures follow-up of decisions.	
Digital governance	E-transaction platforms	E-transaction systems (mobile money payments, bank electronic fund transfer, digital weigh scale) improve financial efficiency.	(Afridi et al., 2023; Cao et al., 2025; Gao, 2023; Moore & Benbasat, 1991)
		Digital payments improve convenience and timeliness.	
		E-platforms enhance financial transparency.	
	Co-operative MIS/MUVU	MIS improves decision-making.	
		MIS improves member data management.	
		MIS enhances performance monitoring.	
	Digital communication platforms	Digital platforms improve board-member communication.	
		Communication is more streamlined within AMCOS.	
		Digital tools improve response to member needs.	
Inclusive Governance	Members deliberative democracy	Members actively participate in decision-making.	(Hartley, 2014; Merlini et al.,

		Leadership encourages open dialogue.	2025; Novkovic, 2021)
		Board decisions reflect member input.	
	Youth inclusion in leadership	Youth (18-35yrs) hold leadership positions.	
		Youth participate in decision-making.	
		Youth contribute innovative ideas.	
	Equal Service Access	All members have equal access to services.	
		Resources are distributed fairly among members.	
		Fair guidelines guide input/service distribution	
Product innovation	Product Diversification	New products/services introduced in last 3 years.	(Laosirihongthong et al., 2014; Maydeu-Olivares & Lado, 2003)
		AMCOS introduces products in response to members' needs and market demand.	
		AMCOS has diversified beyond core products	

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