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Original Research

PERFORMANCE MANAGEMENT SYSTEMS AND HEALTH SERVICE DELIVERY OUTCOMES IN TANZANIA: A MULTILEVEL ANALYSIS OF IMPLEMENTATION, INSTITUTIONAL CAPACITY, AND PUBLIC HEALTH FACILITY PERFORMANCE

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Abstract

Performance management systems (PMS) are widely used to strengthen accountability and improve health service delivery, yet evidence on their effectiveness and the role of institutional capacity (IC) in Tanzania remains limited. This study examined the relationship between PMS implementation and health service delivery outcomes (HSDO) and assessed the mediating and moderating roles of IC in public health facilities in Arusha Region. A cross-sectional quantitative design was employed with 100 health workers selected through stratified quota sampling. Data were collected using a structured five-point Likert-scale questionnaire and analyzed using descriptive statistics, Pearson correlation, regression, mediation, and moderation analyses. PMS implementation was not significantly associated with HSDO. However, IC significantly mediated the relationship between PMS implementation and HSDO, with a positive indirect effect (B = 0.10, 95% CI [0.01, 0.22], p = .050). In contrast, the PMS × IC interaction was not statistically significant, indicating no moderating effect. The findings suggest that IC is an important pathway through which PMS implementation may contribute to health service delivery. Strengthening PMS implementation should therefore be accompanied by measures that enhance IC.

Keywords: Performance Management Systems; Institutional Capacity; Health Service Delivery Outcomes; Public Health Facilities; Tanzania.

1.0 Introduction

Health service delivery outcomes (HSDO) are a critical indicator of public sector performance, reflecting the extent to which health systems meet population health needs while advancing broader social and economic development goals (Eze et al., 2024). Globally, governments are increasingly expected to deliver healthcare that is efficient, effective, equitable, and responsive, consistent with Universal Health Coverage (UHC) and Sustainable Development Goal 3 (SDG 3) (Collins et al., 2023). However, demographic transitions, evolving disease patterns, rising healthcare costs, technological advances, and growing public expectations have intensified these demands, while persistent operational, managerial, and institutional challenges continue to undermine effective service delivery (Jones & Dolsten, 2024).

In Sub-Saharan Africa, these challenges are compounded by resource constraints, shortages of skilled health personnel, inadequate infrastructure, administrative weaknesses, and persistent inequalities in healthcare access (Arhin et al., 2023). Consequently, strengthening accountability, organizational performance, and efficient resource utilization has become a policy priority (Kabongo & Mbonigaba, 2024). As primary providers of essential healthcare, public health facilities are central to delivering timely, accessible, safe, and patient-centered services, highlighting the importance of understanding institutional and organizational factors influencing HSDO (Debie et al., 2024; Msacky, 2024).

In response to growing demands for accountability, efficiency, and service quality, Performance Management Systems (PMS) have emerged as a key governance approach for enhancing organizational performance and monitoring desired outcomes (Pudjono et al., 2025). PMS encompasses performance planning, target setting, monitoring and evaluation, performance appraisal, feedback, and performance-based incentives, aligning strategic priorities with organizational and individual performance while promoting continuous improvement (Lewandowski & Cirella, 2022). Its widespread adoption reflects New Public Management (NPM) and Results-Based Management (RBM) reforms, emphasizing results, accountability, performance measurement, and evidence-informed decision-making. Within the health sector, PMS strengthens governance, managerial processes, accountability, and health service delivery across diverse contexts (Castelo & Gomes, 2024).

In Tanzania, public sector performance reforms have progressed from the Open Performance Review and Appraisal System (OPRAS), introduced in 2004, to the Public Employees Performance Management Information System (PEPMIS) (Tuseko et al., 2025). Although OPRAS institutionalized performance planning and appraisal, its effectiveness was constrained by manual processes, inconsistent monitoring, delayed feedback, and limited managerial use of appraisal results (Sanga et al., 2025). Consequently, PEPMIS was introduced to advance digital government by enhancing transparency, accountability, efficiency, and evidence-based decision-making (John & Mdee, 2026). Aligned with Tanzania's Development Vision 2050, PEPMIS provides a centralized electronic framework for strengthening organizational performance, health system capacity, and health service delivery (United Republic of Tanzania, 2025b).

Empirical evidence indicates that PMS enhance organizational performance by strengthening goal alignment, accountability, performance monitoring, and evidence-based decision-making (de Melo Santos et al., 2025). In the health sector, effective performance management improves service efficiency, quality of care, resource utilization, and organizational learning (Akinbobola et al., 2025). In Tanzania, PEPMIS has improved transparency, fairness, goal alignment, and feedback, although its effectiveness depends on organizational support, staff competence, information and communication technology (ICT) infrastructure, and leadership commitment (John & Mdee, 2026; Silidion & Rutenge, 2024). Similarly, Sikira and Sharma, 2026 emphasize implementation quality as the key determinant of organizational and service delivery outcomes.

Building on these findings, evidence suggests that the influence of PMS on health service delivery depends largely on implementation quality. Effective implementation enhances efficiency, quality of care, responsiveness, and patient satisfaction by strengthening goal clarity, performance monitoring, feedback, and evidence-based managerial decision-making within health facilities (Mirzoev et al., 2025; Shapira et al., 2023). However, these benefits vary across contexts, reflecting differences in defining, monitoring, and using performance targets to guide managerial actions (Aranda et al., 2023; Mboera et al., 2021). Consequently, PMS is increasingly viewed as a governance process whose effectiveness hinges on implementation quality.

Complementing the role of implementation quality, recent scholarship identifies institutional capacity (IC) as another critical determinant of PMS effectiveness in health systems. It encompasses leadership, managerial competence, human resources, financial and infrastructural capacity, health information systems, and accountability mechanisms supporting decision-making. Together, these dimensions shape how performance information is generated, interpreted, and applied to improve service delivery (Tomblin Murphy et al., 2022). Weak IC, including inadequate staffing, poor data systems, and limited managerial support, constrains PMS effectiveness. Conversely, stronger capacity enhances implementation consistency, accountability, and evidence-based decision-making across administrative levels (Kuwawenaruwa et al., 2023).

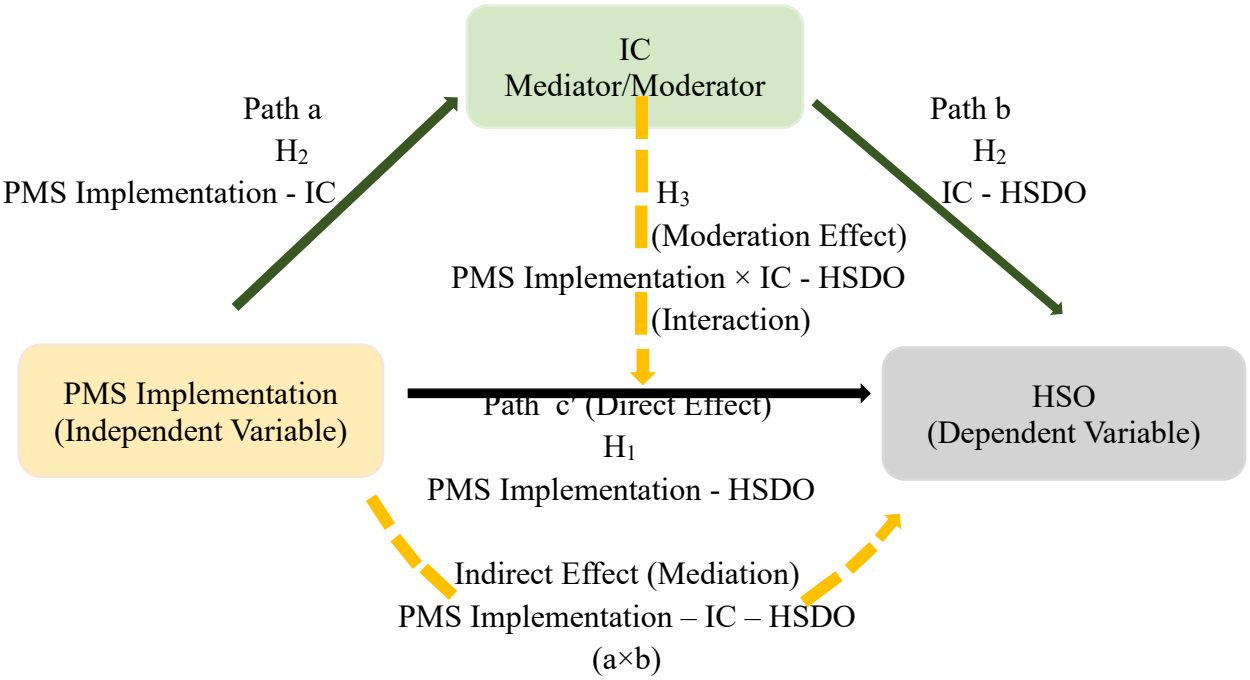
Notwithstanding these insights, important gaps remain in understanding how PMS operate within complex, multilevel health systems, particularly in low- and middle-income countries. Existing research has largely focused on general public sector performance or single administrative levels, providing limited evidence on the extent of PMS implementation across national, regional, district, and facility levels. Moreover, few studies comprehensively examine how PMS implementation influences multiple dimensions of HSDO, particularly the extent to which required health services are delivered without unnecessary delays, essential health services are available when required, follow-up care is maintained for cases requiring continued attention, and required services are completed in accordance with established care procedures. Although IC is widely recognized as an important determinant of organizational performance, its role in explaining the relationship between PMS implementation and HSDO remains insufficiently theorized and empirically examined, particularly in Sub-Saharan Africa.

These gaps are particularly relevant to Tanzania, where substantial performance management reforms have been undertaken, including the transition from OPRAS to PEPMIS. Despite these reforms, empirical evidence remains limited regarding the extent to which PMS is implemented within public health facilities and how its implementation relates to HSDO. More specifically, limited evidence exists on whether IC serves as a mechanism through which PMS implementation is associated with HSDO and whether the level of IC conditions the strength of this relationship. Accordingly, this study examines the relationship between PMS implementation and HSDO in Tanzania's public health facilities by assessing the level of PMS implementation, determining its contribution to HSDO, and examining the mediating and moderating roles of IC within the country's multilevel health system.

Against this backdrop, the study proposes that higher levels of PMS implementation are positively associated with HSDO through the consistent implementation of PEPMIS. These practices encompass the clear establishment of performance expectations, systematic monitoring of staff performance against agreed expectations, formal provision of performance feedback, and use of performance results to guide subsequent improvement actions. Such practices are expected to support the timely delivery of required health services, enhance the availability of essential services when needed, strengthen continuity and follow-up of care, and facilitate completion of required services in accordance with established care procedures.

IC is further expected to play two complementary roles in this relationship. As a mediator, IC may explain how PMS implementation translates into improved HSDO by enabling public health facilities to convert performance-management practices into effective service delivery. As a moderator, IC may condition the strength of the relationship between PMS implementation and HSDO, such that stronger IC provides a more enabling environment for PMS to contribute to service delivery outcomes. In this study, IC is reflected in the facility's staffing capacity to meet its service responsibilities, capacity to maintain essential medicines and medical supplies, adequacy of infrastructure and equipment to support service delivery, and managerial capacity to coordinate service delivery. Accordingly, stronger IC is expected to facilitate the translation of PMS practices into improved HSDO and strengthen the association between PMS implementation and service delivery outcomes.

Accordingly, the study proposes three hypotheses to guide the empirical analysis. Hypothesis 1 (H_1) PMS implementation is positively associated with HSDO in public health facilities in Tanzania; Hypothesis 2 (H_2) IC mediates the relationship between PMS implementation and HSDO; and Hypothesis 3 (H_3) IC moderates the relationship between PMS implementation and HSDO.



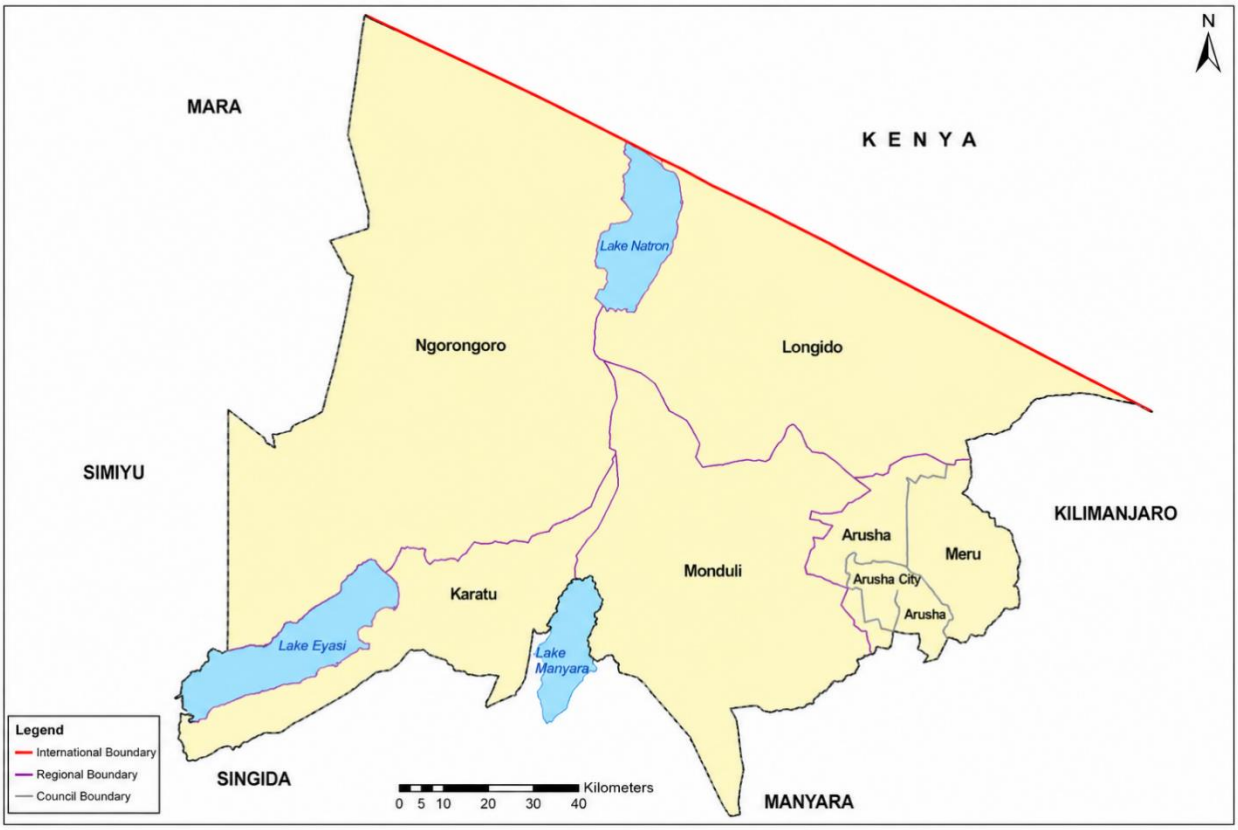
Source: *Authors conceptualization*

Figure 1. Conceptual Framework of PMS, IC, and HSDO

2.0 Materials and Methods

This study employed a cross-sectional quantitative research design, enabling data to be collected from respondents at a single point in time (Maier et al., 2023). The design was appropriate for assessing PMS implementation, IC, and HSDO, and for examining the relationships among these constructs. The study was guided by the positivist paradigm, which emphasizes objective measurement, empirical observation, quantitative data, and statistical analysis (Masuku, 2024). This paradigm was appropriate because the study constructs were operationalized as measurable variables using a structured five-point Likert-scale questionnaire, enabling statistical testing of the proposed relationships.

The study was conducted in Arusha Region, Tanzania, comprising urban, peri-urban, and rural local government authorities (Figure 2). The region was purposively selected because its decentralized public health system includes diverse public health facilities operating in different administrative and service-delivery contexts. This provided an appropriate setting for examining PMS implementation, IC, and HSDO. Arusha is also an important administrative and service-delivery hub in northern Tanzania and continues to implement public-sector reforms aimed at strengthening accountability, performance management, and health-sector governance (United Republic of Tanzania, 2024).



Source: *(United Republic of Tanzania, 2025a)*

Figure 2. Map of Arusha Region

The study population comprised health workers employed in public health facilities in Arusha Region, including Medical Officers, Clinical Officers, Nursing Officers, Pharmaceutical Technicians/Pharmacists, and Laboratory Technicians. These cadres were selected because of their involvement in PMS implementation and health service delivery.

The sample size was determined using Cochran's (1977) formula for populations that are large or unknown (Khalid Ahmed, 2024).

$$n = \frac{Z^2 \times p \times (1-p)}{e^2}$$

where n is the required sample size, Z is the standard normal deviate, p is the estimated population proportion, and e is the acceptable margin of error. Using a 95% confidence level (Z = 1.96), maximum variability (p = 0.50), and a margin of error of 0.098 yielded a minimum sample of 100 respondents. The study therefore used 100 respondents for the final analysis.

A stratified quota sampling technique was used to ensure representation across the five professional cadres. The quotas comprised 19 Medical Officers, 21 Clinical Officers, 38 Nursing Officers, 12 Pharmaceutical Technicians/Pharmacists, and 10 Laboratory Technicians. Because a reliable sampling frame was unavailable, probability-based proportionate sampling was not

feasible. Eligible health workers were recruited from selected facilities until the respective quotas were achieved following informed consent.

Primary data were collected using a structured questionnaire administered electronically through Google Forms. The questionnaire measured three constructs: PMS implementation, institutional capacity (IC), and health service delivery outcomes (HSDO), and constituted the sole source of empirical data for the study. Each construct was measured on a five-point Likert-type scale, with anchors tailored to the construct: PMS implementation from 1 = *Not at all* to 5 = *To a very great extent*; IC from 1 = *Very weak* to 5 = *Very strong*; and HSDO from 1 = *Never* to 5 = *Always*. Items were developed with reference to the study objectives, conceptual framework, and relevant literature.

The measurement model was assessed before inferential analysis. Construct validity was examined using Exploratory Factor Analysis (EFA) with Principal Axis Factoring (PAF), and internal consistency using Cronbach's alpha (α). Sampling adequacy and the suitability of the data for factor analysis were assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's Test of Sphericity, respectively. Factor loadings, communalities, and variance explained were examined in evaluating the measurement items. Items with inadequate factor loadings, low communalities, or weak item-total correlations were excluded. The final measurement model comprised four PMS items, four IC items, and three HSDO items, with each construct yielding a one-factor solution. Composite indices were calculated as the mean of the retained items, yielding PMS_INDEX, IC_INDEX, and HSDO_INDEX for subsequent analysis.

Data were analysed using IBM SPSS Statistics version 20 and Jamovi version 2.7.38.0. SPSS was used for data screening, descriptive statistics, EFA, reliability analysis, Pearson's product-moment correlation, and regression analysis. Frequencies and percentages were used for categorical characteristics, while means, standard deviations, skewness, and kurtosis were used to describe the study variables and assess their distributional properties. Pearson's correlation assessed the direction and strength of associations among PMS implementation, IC, and HSDO, while regression analysis examined the predictive relationships among the constructs. Statistical significance was evaluated at $p < .05$, with 95% confidence intervals reported where applicable.
Mediation analysis was conducted using the *medmod* module in Jamovi, with PMS implementation specified as the predictor, IC as the mediator, and HSDO as the outcome. The model estimated the indirect effect ($a \times b$), direct effect (c'), and total effect, with path a representing PMS implementation → IC and path b representing IC → HSDO while controlling for PMS implementation. The indirect effect was estimated using 5,000 bootstrap resamples with 95% confidence intervals and was considered statistically significant when the interval excluded zero.
Moderation analysis was also conducted using *medmod*, with PMS implementation as the predictor, IC as the moderator, and HSDO as the outcome. The model included PMS implementation, IC, and their interaction (PMS implementation × IC). A significant interaction was interpreted as evidence that the PMS implementation–HSDO relationship varied according to IC. Conditional effects were examined at low (−1 SD), mean, and high (+1 SD) levels of IC, and an interaction plot was used to aid interpretation.

Permission to conduct the study was obtained from the relevant authorities overseeing the selected public health facilities. Participation was voluntary, informed consent was obtained from all respondents, and confidentiality and anonymity were maintained. The data were securely stored and used solely for academic purposes.

3.0 Results

This section presents the empirical findings of the study in accordance with the research objectives. It begins by describing the demographic characteristics of the respondents and evaluating the reliability and construct validity of the measurement scales. Subsequently, descriptive and inferential statistical analyses are presented to examine the relationships among PMS, IC, and HSDO, including the mediating and moderating roles of IC.

3.1 Respondents Demographic Characteristics

The study included 100 respondents drawn from public health facilities in Tanzania. The sample comprised 52 (52.0%) male and 48 (48.0%) female respondents, indicating a relatively balanced gender distribution. Regarding educational attainment, the majority of respondents held diploma qualifications (59.0%), followed by bachelor's degrees (28.0%) and certificates (13.0%).

The respondents represented a diverse range of professional cadres, with Nursing Officers constituting the largest group (38.0%), followed by Clinical Officers (21.0%), Medical Officers (19.0%), Pharmaceutical Technicians/Pharmacists (12.0%), and Laboratory Technicians (10.0%). Most participants were drawn from Health Centers (46.0%) and Dispensaries (43.0%), while District Hospitals and Regional Referral Hospitals accounted for a smaller proportion of the sample (10.0% and 1.0%, respectively). In terms of professional experience, nearly two-thirds of the respondents had ten years or less of service, with 39.0% reporting less than five years and 31.0% reporting between five and ten years of experience.

Table 1. Demographic Characteristics of Respondents (N = 100)

Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	52	52.0
	Female	48	48.0
Education level	Certificate	13	13.0
	Diploma	59	59.0
	Bachelor's degree	28	28.0
Professional cadre	Medical Officer	19	19.0
	Clinical Officer	21	21.0
	Nursing Officer	38	38.0
	Pharmaceutical Technician/Pharmacist	12	12.0
	Laboratory Technician	10	10.0
Type of health facility	Dispensary	43	43.0
	Health Centre	46	46.0
	District Hospital	10	10.0
	Regional Referral Hospital	1	1.0
Years of experience	Less than 5 years	39	39.0
	5–10 years	31	31.0
	11–15 years	17	17.0
	More than 15 years	13	13.0

3.2 Reliability and Construct Validity Assessment

The reliability and construct validity of the study measures were assessed before hypothesis testing. Internal consistency was evaluated using α, while construct validity was examined using EFA with PAF. The KMO measure, Bartlett's Test of Sphericity, factor loadings, communalities, and variance explained were assessed.

Table 2. Reliability and Construct Validity Assessment of Study Constructs

Construct	Items	α	KMO	Bartlett's χ^2 (df)	P	Factor Loadings	Communalities	Variance Explained (%)
PMS	4	.785	.779	107.878 (6)	<.001	.614–.803	.383–.645	48.53
IC	4	.742	.745	84.310 (6)	<.001	.562–.709	.316–.503	42.57
HSDO	3	.757	.681	72.499 (3)	<.001	.650–.814	.423–.663	51.75

All constructs demonstrated acceptable internal consistency, with α values ranging from .742 to .785. The KMO values (.681–.779) and significant Bartlett's tests ($p < .001$) confirmed the

suitability of the data for factor analysis. Each construct yielded a one-factor solution. Factor loadings ranged from .614 to .803 for PMS and from .562 to .709 for IC, while HSDO loadings ranged from .650 to .814. Within the HSDO scale, the item assessing whether follow-up care is maintained for cases requiring continued attention showed comparatively weak factor loading (.413), low communality (.170), and a relatively low item-total correlation (.362). The item was therefore excluded from the final HSDO scale. Following its removal, the reliability of the HSDO scale improved from α = .731 to .757, while the retained items accounted for 51.75% of the total variance. Overall, the findings support the internal consistency and construct validity of the final measurement scales and their use in subsequent analyses.

3.3 Descriptive Statistics of the Study Constructs

Descriptive statistics were computed for the composite indices representing PMS implementation, IC, and HSDO. Table 3 presents the descriptive and distributional characteristics of the study constructs, including the number of observations (N), mean scores (M), standard deviations (SD), minimum and maximum values, skewness, and kurtosis.

Table 3. Descriptive Statistics of Study Variables (N = 100)

Variable	N	M	SD	Minimum	Maximum	Skewness	Kurtosis
PMS Implementation Index	100	2.64	0.99	1.00	5.00	0.51	-0.19
IC Index	100	2.73	0.97	1.00	4.75	0.21	-0.65
HSDO Index	100	3.07	0.95	1.00	5.00	0.01	-0.57

HSDO recorded the highest mean score (M = 3.07, SD = 0.95), followed by IC (M = 2.73, SD = 0.97), whereas PMS implementation recorded the lowest mean score (M = 2.64, SD = 0.99). The standard deviations indicate moderate variability in respondents' assessments across the three constructs. Skewness values ranged from 0.014 to 0.514, while kurtosis values ranged from −0.646 to −0.194, suggesting that the distributions did not exhibit substantial departures from normality. Overall, the composite indices demonstrated acceptable distributional properties, supporting their use in subsequent Pearson correlation and regression analyses.

3.4 Assessment of PMS Implementation in Public Health Facilities

PMS implementation was assessed using four validated questionnaire items reflecting key aspects of performance management practices in public health facilities. Descriptive statistics were computed for each item and the overall PMS Implementation Index. The results are presented in Table 4.

Table 4. Descriptive Statistics for PMS Implementation Indicators (N = 100)

PMS Implementation Indicator	M	SD
Performance expectations are clearly established for staff	2.64	1.31
Staff performance is systematically monitored against agreed expectations	2.82	1.26
Performance feedback is formally provided to staff	2.60	1.26
Performance results inform subsequent improvement actions	2.49	1.24
Overall PMS Implementation Index	2.64	0.99

The descriptive statistics presented in Table 4 indicate variation in respondents' assessments across the four PMS implementation indicators. The highest mean was recorded for systematic monitoring of staff performance against agreed expectations (M = 2.82, SD = 1.26), followed by the establishment of clear performance expectations (M = 2.64, SD = 1.31). Formal provision of performance feedback recorded a similar mean (M = 2.60, SD = 1.26), while the use of performance results to inform subsequent improvement actions recorded the lowest mean (M = 2.49, SD = 1.24). Overall, the PMS Implementation Index had a mean of 2.64 (SD = 0.99), indicating that perceived PMS implementation was below the midpoint of the five-point scale.

3.5 Predictive Contribution of PMS on HSDO

The relationship between PMS implementation and HSDO was examined using descriptive statistics, Pearson correlation analysis, and simple linear regression analysis. Descriptive statistics were first computed to summarize the HSDO indicators, followed by Pearson correlation analysis to assess the association between PMS implementation and HSDO. A simple linear regression analysis was then conducted to estimate the predictive contribution of PMS implementation to HSDO.

Table 5. Descriptive Statistics for HSDO Indicators (N = 100)

HSDO Indicator	M	SD
Required health services are delivered without unnecessary delays	3.09	1.17
Essential health services are available when required	3.07	1.19
Required services are completed according to established care procedures	3.05	1.12
Overall HSDO Index	3.07	0.95

Table 5 presents the descriptive statistics for the three retained HSDO indicators and the overall HSDO index. Mean scores ranged from 3.05 to 3.09, with the highest recorded for delivery of required health services without unnecessary delays (M = 3.09, SD = 1.17) and the lowest for completion of required services according to established care procedures (M = 3.05, SD = 1.12). The overall HSDO index had a mean of 3.07 (SD = 0.95). The index showed skewness of 0.014 and kurtosis of −0.571.

3.5.1 Pearson Correlation Between PMS Implementation and HSDO

Pearson correlation analysis was conducted to examine the association between PMS implementation and HSDO among the 100 respondents. As shown in Table X, PMS implementation was weakly and positively correlated with HSDO (r = .120). However, the correlation was not statistically significant (p = .233). The 95% bias-corrected and accelerated (BCa) bootstrap confidence interval for the correlation ranged from −.077 to .321, based on 2,000 bootstrap samples.

Table 6. Pearson Correlation between PMS Implementation and HSDO (N = 100)

Variable	M	SD	1	2
1. PMS implementation	2.64	0.99	1.00	.120
2. HSDO	3.07	0.95	.120	1.00

3.5.2 Simple Linear Regression Analysis of PMS Implementation Predicting HSDO

A simple linear regression analysis was conducted to examine whether PMS implementation predicted HSDO. HSDO was entered as the dependent variable, while PMS implementation was specified as the independent variable. The analysis was based on 100 observations. The regression model summary, analysis of variance, and regression coefficients are presented in Table 7.

Table 7. Simple Linear Regression of PMS Implementation on HSDO (N = 100)

Predictor	B	SE	B	t	p	95% CI for B
Constant	2.76	0.27	—	10.12	<.001	[2.22, 3.31]
PMS implementation	0.12	0.10	0.12	1.20	.233	[−0.08, 0.31]

Model statistics: *R = .12, R^2 = .01, Adjusted R^2 = .00, $F(1, 98)$ = 1.44, p = .233, Durbin–Watson = 1.97.*

The results indicate that the regression model was not statistically significant, $F(1, 98) = 1.44$, p = .233. PMS implementation had a positive regression coefficient (B = 0.12, β = .12), but the coefficient was not statistically significant (t = 1.20, p = .233). The 95% confidence interval for the coefficient ranged from −0.08 to 0.31. The model explained 1.4% of the variance in HSDO (R^2 = .014).

3.6 Mediating and Moderating Roles of IC in the Relationship between PMS Implementation and HSDO

The mediating and moderating roles of IC in the relationship between PMS) implementation and HSDO were examined using mediation and moderation analyses. The analyses were conducted using a sample of 100 observations. Mediation analysis assessed whether PMS implementation was indirectly associated with HSDO through IC, while moderation analysis assessed whether the

strength of the relationship between PMS implementation and HSDO varied according to the level of IC.

3.6.1 Mediating Role of IC on the Relationship between PMS Implementation and HSDO

The mediation model specified PMS implementation as the predictor, IC as the mediator, and HSDO as the outcome. The results are presented in Table 8. PMS implementation was positively and statistically significantly associated with IC (path *a*: B = 0.23, SE = 0.11, 95% CI [0.03, 0.44], p = .027), while IC was positively and statistically significantly associated with HSDO after controlling for PMS implementation (path *b*: B = 0.45, SE = 0.09, 95% CI [0.28, 0.63], p < .001). The indirect effect of PMS implementation on HSDO through IC was positive (B = 0.10, SE = 0.05), with a 95% confidence interval ranging from 0.01 to 0.22 and p = .050. Since the confidence interval did not include zero, the indirect effect was statistically supported.

In contrast, the direct effect of PMS implementation on HSDO after accounting for IC was not statistically significant (B = 0.01, SE = 0.09, 95% CI [-0.17, 0.20], p = .898). The total effect of PMS implementation on HSDO was likewise not statistically significant (B = 0.12, SE = 0.10, 95% CI [-0.07, 0.31], p = .231). Thus, the mediation analysis showed a positive indirect association between PMS implementation and HSDO through IC, while neither the direct nor total effect of PMS implementation on HSDO was statistically significant.

Table 8. Mediation Effects of IC in the Relationship between PMS Implementation and HSDO (N = 100)

Effect	Path	B	SE	95% CI Lower	95% CI Upper	Z	p
PMS implementation → IC	a	0.23	0.11	0.03	0.44	2.21	.027
IC → HSDO	b	0.45	0.09	0.28	0.63	4.99	< .001
PMS implementation → HSDO, controlling for IC	c′	0.01	0.09	-0.17	0.20	0.13	.898
Indirect effect	a × b	0.10	0.05	0.01	0.22	1.96	.050
Total effect	c′ + a × b	0.12	0.10	-0.07	0.31	1.20	.231

3.6.2 Moderating Role of IC on the Relationship between PMS Implementation and HSDO

A moderation analysis was subsequently conducted to determine whether IC significantly altered the relationship between PMS implementation and HSDO. The model included PMS implementation, IC, and their interaction term (PMS implementation × IC) as predictors of HSDO, with the results presented in Table 9. IC showed a positive and statistically significant association with HSDO (B = 0.47, SE = 0.09, 95% CI [0.30, 0.64], p < .001), whereas the main effect of PMS implementation was not statistically significant (B = 0.01, SE = 0.09, 95% CI [-0.16, 0.19], p =

.881). The interaction between PMS implementation and IC was negative but not statistically significant (B = -0.13, SE = 0.09, 95% CI [-0.31, 0.06], p = .159), and its confidence interval included zero.

Simple-slope analysis was therefore examined at low (-1 SD), average, and high (+1 SD) levels of IC. At low IC, the effect of PMS implementation on HSDO was not statistically significant (B = 0.14, SE = 0.12, 95% CI [-0.10, 0.37], p = .240); at the average level, the effect was also not statistically significant (B = 0.01, SE = 0.09, 95% CI [-0.16, 0.19], p = .881); and at high IC, the effect remained statistically non-significant (B = -0.11, SE = 0.13, 95% CI [-0.36, 0.17], p = .399). Overall, the moderation results indicated that although IC was significantly associated with HSDO, the PMS implementation × IC interaction was not statistically significant, and the effect of PMS implementation on HSDO did not reach statistical significance at any of the three examined levels of IC.

Table 9. Moderation Analysis of IC on the Relationship Between PMS Implementation and HSDO (N = 100)

Predictor	B	SE	95% CI Lower	95% CI Upper	Z	p
PMS implementation (b_1)	0.01	0.09	-0.16	0.19	0.15	.881
IC (b_2)	0.47	0.09	0.30	0.64	5.30	< .001
PMS implementation × IC (b_3)	-0.13	0.09	-0.31	0.06	-1.41	.159

4.0 Discussion

This chapter discusses the study findings on the relationship between PMS implementation and HSDO, with particular focus on the mediating and moderating roles of IC. The findings are interpreted in relation to the study hypotheses, relevant theory, and previous empirical evidence.

4.1 Relationship between PMS Implementation and HSDO

The findings did not support H_2, which proposed that PMS implementation is positively associated with HSDO in public health facilities in Tanzania. Pearson correlation indicated a weak positive relationship between PMS implementation and HSDO, but the association was not statistically significant (r = 0.12, p = .116). Consistent with this result, simple linear regression showed that PMS implementation did not significantly predict HSDO (B = 0.12, p = .233), with the model explaining only 1.4% of the variation in HSDO (R^2 = .014). Thus, although the direction of the association was positive, the evidence was insufficient to conclude that higher PMS implementation was directly associated with better HSDO in the study population.

The absence of a significant direct association suggests that the implementation of PMS procedures alone may not be sufficient to produce measurable improvements in health service delivery. Although PMS is designed to strengthen goal setting, performance monitoring,

accountability, feedback, and the use of performance information, these mechanisms may generate meaningful outcomes only when they are effectively incorporated into organizational processes and managerial decision-making. This interpretation is consistent with evidence that the adoption of performance-management arrangements does not necessarily translate into improved organizational outcomes when performance information is not meaningfully used within organizational processes (Cantarelli et al., 2023; Oh, 2024).

The finding also qualifies the assumptions underlying NPM and RBM, which emphasize performance measurement, accountability, target orientation, and evidence-based management as mechanisms for improving public-sector effectiveness (van der Kolk & Berend van der Kolk, 2022). In health facilities, however, the availability of performance information does not necessarily ensure that identified performance gaps will be addressed. Effective supervision, managerial responsiveness, adequate resources, and organizational capacity to act on performance information may be required before performance-management practices translate into improved service delivery (Anders, 2024). This consideration is particularly relevant in resource-constrained public health settings, where staffing, infrastructure, and other institutional limitations can constrain the implementation of corrective actions (Aranda et al., 2023).

Importantly, the non-significant direct relationship provides a basis for interpreting the subsequent mediation findings. While PMS implementation was not significantly associated with HSDO when examined independently, it was positively associated with IC, and IC was subsequently positively associated with HSDO. This pattern suggests that the potential contribution of PMS to health service delivery may operate through organizational mechanisms rather than through a simple direct pathway. In this respect, the findings are consistent with the view that performance-management systems are more likely to generate organizational benefits when institutions possess the capacity to interpret performance information and translate it into planning, supervision, resource allocation, and service-improvement actions (Cantarelli et al., 2023; Castelo & Gomes, 2024).

Overall, the findings do not provide empirical support for a direct PMS–HSDO relationship and therefore do not support H_1. Rather, they indicate that the relationship may be more appropriately understood through the institutional processes connecting PMS implementation with health service delivery. This provides the empirical basis for examining IC as a mediating mechanism in the subsequent subsection, where the indirect pathway from PMS implementation through IC to HSDO is considered.

4.2 Mediating Role of IC in the Relationship between PMS Implementation and HSDO

The findings supported H_2, demonstrating a statistically supported indirect relationship between PMS implementation and HSDO through IC. PMS implementation was positively associated with IC (path *a*: $B = 0.23$, $p = .027$), while IC was positively associated with HSDO after controlling for PMS implementation (path *b*: $B = 0.45$, $p < .001$). The indirect effect was positive and statistically supported ($B = 0.10$, 95% CI [0.01, 0.22], $p = .050$), whereas the direct effect of PMS implementation on HSDO after accounting for IC was not statistically significant ($B = 0.01$, $p =$

.898). These findings indicate that the association between PMS implementation and HSDO is better understood through an institutional pathway in which PMS implementation is associated with stronger IC, which in turn is associated with improved HSDO.

The positive association between PMS implementation and IC is consistent with IC perspectives, which emphasize that organizational reforms are more likely to generate meaningful outcomes when institutions possess the capabilities necessary to implement, sustain, and operationalize them (Christensen et al., 2022). In public health facilities, such capabilities may include managerial competence, leadership commitment, skilled personnel, functional information systems, adequate resources, and effective coordination. These capabilities are particularly important because performance information does not automatically result in organizational improvement; its value depends on the ability of managers and health workers to interpret performance information, identify performance gaps, and translate the findings into appropriate actions. The significant PMS–IC pathway therefore suggests that implementation of performance-management practices may contribute to strengthening the organizational conditions required for effective service delivery.

The significant IC–HSDO pathway further highlights the importance of organizational capability in translating management practices into service delivery outcomes. Consistent with Jiyenze et al. (2023), IC enables health organizations to utilize information, coordinate activities, mobilize available resources, and support managerial and operational decision-making. In the present study, the positive association between IC and HSDO suggests that facilities with stronger IC may be better positioned to convert performance expectations and information into improvements in service delivery. This pathway also helps explain the absence of a statistically significant direct PMS–HSDO relationship identified in subsection 4.2: PMS implementation may establish performance-management processes and generate performance information, but their contribution to service delivery may depend on the IC available to act upon them.

The mediating finding is particularly relevant to digital performance-management practices such as PEPMIS. Electronic performance-management systems can facilitate the generation, documentation, and accessibility of performance information, but these functions alone do not guarantee improvements in service delivery. Their practical value depends on whether health facilities possess sufficient managerial expertise, personnel, resources, and organizational arrangements to use the information generated for planning, supervision, and corrective action. This consideration is especially pertinent in low- and middle-income country settings, where public-sector reforms may be implemented amid resource constraints and differences in managerial and IC (Knox & Sharipova, 2023). Thus, the mediation finding provides a plausible organizational explanation for why performance-management arrangements may not produce equivalent outcomes across health facilities.

The finding extends the interpretation of PMS beyond a direct-effect perspective by demonstrating that its potential contribution to HSDO may involve organizational processes through which performance-management practices are associated with IC and, subsequently, service delivery outcomes. This supports an integrated view of PMS and IC rather than treating

PMS as a standalone technical intervention. In practical terms, the findings suggest that strengthening PMS implementation may need to be accompanied by measures that develop the organizational capabilities required to interpret and use performance information effectively.

Overall, the statistically supported indirect effect provides evidence that IC mediates the relationship between PMS implementation and HSDO, supporting H_2. Importantly, this conclusion does not imply that PMS has a statistically significant direct effect on HSDO. Rather, the findings indicate that the contribution of PMS to HSDO is more appropriately understood through the indirect institutional pathway identified in this study. IC therefore emerges as an important organizational mechanism linking performance-management implementation with HSDO.

4.3 Moderating Role of IC in the Relationship between PMS Implementation and HSDO

The findings did not support H_3, which proposed that IC moderates the relationship between PMS implementation and HSDO. Although IC was positively and significantly associated with HSDO ($B = 0.47$, $p < .001$), the interaction between PMS implementation and IC was not statistically significant ($B = -0.13$, $p = .159$, 95% CI [−0.31, 0.06]). The confidence interval included zero, indicating that the strength of the PMS–HSDO relationship did not vary significantly across different levels of IC in the study sample. Thus, the findings do not provide empirical evidence that higher IC strengthens the effect of PMS implementation on HSDO.

The non-significant interaction is important to distinguish from the significant main effect of IC. While stronger IC was independently associated with better HSDO, this did not mean that IC changed the strength of the relationship between PMS implementation and HSDO. In other words, IC appears to be relevant to HSDO in its own right, but the evidence does not demonstrate that differences in IC systematically amplified or weakened the effect of PMS implementation. This distinction is supported by the simple-slope analysis, which showed that the association between PMS implementation and HSDO was not statistically significant at low IC ($B = 0.14$, $p = .240$), average IC ($B = 0.01$, $p = .881$), or high IC ($B = -0.11$, $p = .399$).

The finding can nevertheless be considered in relation to contingency perspectives, which propose that the effectiveness of management systems may depend on the organizational and contextual conditions within which they are implemented (Knox & Sharipova, 2023). From this perspective, IC could theoretically be expected to influence how effectively performance-management practices are translated into organizational improvements. However, the present findings do not provide sufficient statistical evidence to establish IC as such a boundary condition. The results therefore suggest that the theoretical relevance of organizational context should not automatically be interpreted as evidence of a moderating effect in the empirical setting.

This finding is also relevant to the Tanzanian public health context, where facilities may differ in managerial capability, human resources, information systems, infrastructure, and operational resources. Although such differences may affect how PMS is implemented and used, the present analysis indicates that they did not significantly alter the relationship between PMS implementation and HSDO. Consequently, while strengthening IC may remain important for

improving health service delivery, the findings do not support the specific proposition that increasing IC will strengthen the effect of PMS implementation on HSDO.

The moderation finding becomes particularly meaningful when considered alongside the mediation result. The mediation analysis demonstrated that PMS implementation was associated with HSDO indirectly through IC, whereas the moderation analysis did not establish IC as a factor that changed the strength of the PMS–HSDO relationship. Thus, the two analyses point to different roles for IC within the same conceptual relationship. IC appears to function more convincingly as an organizational mechanism through which PMS implementation is associated with HSDO than as a condition that determines whether the PMS effect becomes stronger or weaker.

Overall, the moderation analysis did not provide empirical support for H_3. The non-significant PMS × IC interaction indicates that the effect of PMS implementation on HSDO did not differ significantly across levels of IC. At the same time, the significant positive association between IC and HSDO, together with the statistically supported mediation pathway, confirms the importance of IC in understanding HSDO. Accordingly, the findings characterize IC primarily as a mediating organizational mechanism rather than a moderating condition in the PMS–HSDO relationship examined in this study.

4.4 Interpretation and Implications of the Findings

Taken together, the findings provide a more nuanced explanation of the relationship between PMS implementation, IC, and HSDO in public health facilities in Tanzania. The absence of a statistically significant direct relationship between PMS implementation and HSDO means that PMS implementation, when considered independently, did not demonstrate a measurable direct contribution to HSDO in the study sample. However, the statistically supported indirect effect through IC indicates that PMS implementation may be associated with HSDO through the organizational capacity required to translate performance-management processes and information into service-delivery improvements. At the same time, the non-significant interaction between PMS implementation and IC indicates that IC did not significantly alter the strength of the PMS–HSDO relationship. The findings therefore identify mediation, rather than moderation, as the empirically supported role of IC in the conceptual framework.

From a theoretical perspective, these findings contribute to the understanding of performance management in public-sector health systems by linking performance-management processes with organizational capacity. The results suggest that PMS should not be viewed solely as a technical mechanism for setting targets, monitoring performance, and generating reports. Its potential contribution to service delivery is connected to the organizational mechanisms through which performance information is interpreted and translated into action. This perspective complements performance-management approaches emphasizing accountability, performance information, and results orientation, while also highlighting the importance of institutional conditions surrounding implementation.

The findings also have implications for health-sector management in Tanzania. The significant association between IC and HSDO, together with its mediating role, suggests that

strengthening ICs may be important for realizing the potential benefits of PMS. Efforts to improve PMS implementation may therefore need to be accompanied by attention to managerial competencies, human-resource capacity, information systems, coordination, and the organizational ability to act on performance information. However, because the moderation analysis was not statistically significant, the findings should not be interpreted as demonstrating that increasing IC will necessarily strengthen the PMS–HSDO relationship. Rather, the evidence supports IC as part of the pathway through which PMS implementation is associated with HSDO.

For policy and practice, the results point toward an integrated approach to performance-management reform. Strengthening PMS platforms and procedures without developing the organizational capabilities needed to use the resulting information may have limited implications for service delivery. Conversely, investments in IC may contribute directly to HSDO while also providing the organizational pathway through which performance-management practices can have greater practical relevance. This implication is consistent with the study's broader finding that the effectiveness of performance-management reforms depends not only on their formal implementation but also on the organizational processes through which they are operationalized.

Importantly, these implications remain bounded by the empirical evidence of the present study. The cross-sectional design permits examination of statistical associations and indirect pathways but does not establish temporal causality. Similarly, the supported mediation should be interpreted as an empirically observed indirect association rather than definitive proof that PMS implementation causes changes in IC that subsequently cause improvements in HSDO. This distinction is important when translating the findings into policy recommendations and provides a basis for the limitations and future research considerations presented in the next subsection.

4.5 Limitations and Future Research Directions

This study should be interpreted in light of several methodological and contextual limitations. First, the cross-sectional design captured PMS implementation, IC, and HSDO at a single point in time. Although the analyses identified statistically meaningful associations and an indirect pathway through IC, the design does not establish temporal or causal relationships among the variables. In particular, the mediation finding should therefore be interpreted as evidence of an indirect statistical association rather than definitive evidence that PMS implementation causes changes in IC that subsequently produce changes in HSDO.

Second, the study relied primarily on self-reported questionnaire data from health workers. Although the use of standardized composite measures and reliability and validity assessment strengthened the measurement process, responses may still be influenced by individual perceptions, reporting tendencies, or respondents' understanding of PMS practices and institutional conditions. Future studies could strengthen the evidence base by combining survey responses with objective indicators, such as facility performance records, service-utilization measures, PEPMIS records, staffing levels, and other administrative data. Such triangulation could provide a more comprehensive assessment of the relationship between performance-management practices and actual service delivery outcomes.

Third, the study was conducted among health workers in public health facilities in Arusha Region and used stratified quota sampling because a reliable sampling frame was not available. While this approach ensured representation of the selected professional cadres, it limits the extent to which the findings can be generalized to all public health facilities in Tanzania. Future research could employ probability-based sampling across multiple regions and include a larger number of facilities to establish whether the observed relationships are consistent across different geographical, administrative, and health-system contexts.

Finally, the non-significant moderation effect indicates that IC did not significantly change the strength of the PMS–HSDO relationship in the present sample, despite its statistically supported mediating role. Future research could examine whether other organizational or contextual factors, such as leadership, resource availability, organizational culture, staff motivation, infrastructure, or quality of performance-information use, better explain variations in the effectiveness of PMS. Longitudinal and multilevel studies would also be valuable for examining how PMS implementation and IC evolve over time and how facility-level conditions influence HSDO. Such research could provide stronger evidence regarding the mechanisms through which performance-management reforms contribute to health-system performance in Tanzania.

5.0 Conclusion

This study examined the relationship between PMS implementation and HSDO and further assessed the mediating and moderating roles of IC in public health facilities in Tanzania. The findings indicate that PMS implementation was not significantly associated with HSDO through a direct pathway, and therefore H_1 was not supported. However, the mediation analysis demonstrated a statistically supported indirect relationship through IC, providing support for H_2. In contrast, the PMS × IC interaction was not statistically significant, and the simple-slope effects were non-significant, resulting in H_3 not being supported.

The findings therefore position IC as an important mediating mechanism, rather than a moderating condition, in the PMS–HSDO relationship. This suggests that the potential contribution of performance-management reforms to health service delivery is linked to the organizational capacity through which performance processes and information are translated into practice. The study consequently highlights the importance of considering PMS implementation together with the institutional capabilities required to operationalize it.

Overall, the study contributes empirical evidence from Tanzania's public health sector by demonstrating that the relationship between performance management and service delivery is not adequately explained by a direct-effect model alone. The findings support an organizationally embedded understanding of PMS, in which IC constitutes an important pathway connecting performance-management implementation with HSDO

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