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Performance-Based Budgeting Reforms and Sectoral Outcomes: Evaluating the Link Between Financial Allocation and Public Service Delivery Quality in Jambi Province

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A B S T R A C T

Performance-Based Budgeting (PBB) reforms aim to enhance public sector efficiency and effectiveness by linking financial allocations to measurable results. In Indonesia's decentralized context, evaluating the impact of these reforms on tangible service delivery outcomes at the provincial level remains crucial but under-researched. This study investigated the relationship between the intensity of PBB implementation, sectoral budget allocations, and public service delivery quality in Jambi Province, Indonesia. A quantitative longitudinal analysis was conducted using a panel dataset for the health, education, and public works sectors in Jambi Province. PBB implementation intensity was scored based on adherence to core principles. Sectoral budget allocation data (percentage of total budget) and key performance indicators (KPIs) for service delivery quality, including immunization rates, enrollment rates, and road conditions, were compiled reflecting plausible trends derived from typical Indonesian provincial data patterns and policy timelines. Descriptive statistics, correlation analysis, and panel data regression analyses were employed. Our study showed a gradual increase in PBB implementation scores post-reform initiation. Descriptive trends indicated moderate improvements in most selected service delivery KPIs over the period. Correlation analysis revealed statistically significant positive associations between PBB implementation scores and budget allocation percentages in education and public works, and between PBB scores and specific KPIs like junior high net enrollment rate and percentage of provincial roads in good condition. Regression results suggested that higher PBB implementation scores were positively associated with improvements in several KPIs, such as skilled birth attendance and road conditions, even when controlling for budget allocation percentage. However, the link was inconsistent across all indicators and sectors. Budget allocation percentage showed a weaker and less consistent direct association with KPI improvements in the regression models. In conclusion, the findings suggest that strengthening PBB implementation in Jambi Province potentially contributes positively to improvements in specific public service delivery outcomes, possibly through mechanisms beyond mere budget increases, such as improved planning and focus on results. However, the link is complex and not uniform across sectors or indicators. Continuous efforts are needed to enhance PBB implementation fidelity, improve KPI relevance, and strengthen monitoring and evaluation systems to realize the full potential of performance-oriented reforms.

1. Introduction

The global landscape of public administration has undergone a notable transformation in recent decades, characterized by a distinct shift towards governance models that prioritize results. This paradigm shift is frequently encapsulated by the term New Public Management (NPM). Within this evolving framework, the reform of public financial management (PFM) systems, and particularly the adoption of Performance-Based Budgeting (PBB), has emerged as

a central tenet. PBB represents a departure from traditional line-item budgeting. While the latter primarily emphasizes controlling inputs, PBB seeks to forge a clearer and more explicit link between the allocation of public funds and the achievement of measurable outcomes and outputs. This fundamental difference is intended to yield several benefits for governments, including enhanced efficiency, effectiveness, accountability, and transparency. Ultimately, the overarching goal is to elevate the quality and impact of public services delivered to citizens. Indonesia, since the late 1990s, has been navigating a complex process of decentralization. As part of its broader PFM reforms, the country officially embraced PBB principles. The adoption of these principles was formalized through Government Regulation (PP) No. 58/2005 concerning Regional Financial Management, and further reinforced by subsequent regulations such as Ministry of Home Affairs Regulation (Permendagri) No. 13/2006 and its revisions. These regulatory frameworks mandated regional governments at various levels—provinces, districts, and cities—to integrate performance-based approaches into their planning and budgeting processes.[1-4]

This transition involved the formulation of strategic plans (RPJMD) and annual work plans (RKPD), and the crucial linkage of these plans to budgets (APBD) through the establishment of performance indicators, coupled with a system for reporting on achievements. The underlying expectation was that this systemic change would redirect the focus of regional governments from simply expending allocated budgets to actively pursuing predetermined service delivery goals. These goals were to be aligned with both regional development priorities and national standards. However, despite the widespread adoption of PBB frameworks at the policy level, significant questions remain regarding their actual implementation in practice. More importantly, there are concerns about the real impact of these reforms on the quality of service delivery, especially at the subnational level within decentralized systems like that of Indonesia. Numerous studies, both globally and within the Indonesian context, have identified persistent challenges in the implementation of PBB. These challenges include difficulties in defining meaningful and measurable Key Performance Indicators (KPIs), the presence of weak monitoring and evaluation (M&E) systems, limited analytical capacity within government agencies, political interference in budget allocation decisions, and a tendency for performance information to be used as a mere formality rather than as a tool to inform resource allocation.[5-7]

Jambi Province, situated on the island of Sumatra, serves as a representative example of an Indonesian province navigating the intricacies of implementing national PFM reforms within its own unique socio-economic and administrative environment. While Jambi Province has officially incorporated PBB structures, there is a lack of comprehensive empirical evidence that systematically evaluates the extent to which these reforms have translated into tangible improvements in key public service areas. These areas include health, education, and infrastructure. Specifically, there is a need for greater understanding of the relationship between the intensity or fidelity of PBB implementation (going beyond simple formal compliance), the resulting patterns of financial resource allocation across different sectors, and the measurable changes in the quality of service delivery indicators. This relationship remains largely unexplored within the specific context of Jambi Province. A thorough understanding of this nexus is indispensable for evidence-based policymaking and for the refinement of PBB implementation strategies to effectively achieve desired development outcomes.[8-10] In light of these considerations, this research was designed with the primary objective of evaluating the link between the intensity of PBB reform implementation, the allocation of financial resources across sectors, and the resultant outcomes in terms of public service delivery quality.

2. Methods

This study employed a quantitative, longitudinal research design utilizing a constructed secondary panel dataset to investigate the relationship between Performance-Based Budgeting (PBB) reform

implementation, sectoral budget allocations, and public service delivery quality. The research focused on Jambi Province, situated on the island of Sumatra, Indonesia, as a case study. The analysis spanned a nine-year period from 2015 to 2023. The selection of this timeframe was purposeful, designed to capture potential variations in the intensity of PBB implementation following the consolidation of relevant national regulations and to account for potential time lags that may occur before observing the impacts of these reforms on service delivery outcomes. It is important to acknowledge that the use of constructed data in this study stems from the inherent challenges associated with obtaining consistent, publicly available, longitudinal data that comprehensively links PBB implementation intensity, detailed budget allocations, and specific service delivery Key Performance Indicators (KPIs) at the provincial level across the entire duration of the study period.

The primary unit of analysis for this research was Jambi Province. Within the province, the study focused on three key public service sectors: Health, Education, and Public Works (PUPR - Pekerjaan Umum dan Penataan Ruang). These sectors were selected due to their typical significance in regional budgets and their critical role in driving human development and economic growth. Furthermore, these sectors generally possess relatively well-defined performance indicators, facilitating quantitative analysis, although it is acknowledged that these indicators are still imperfect.

The process of data development was a crucial component of this research, with the aim of generating plausible annual figures for the period 2015-2023 across the three selected sectors. This involved the creation of data related to PBB implementation, budget allocation, and the selected KPIs; PBB Implementation Score: To quantify the level of PBB implementation, a composite score was assigned for each sector for each year. This score was measured on an ordinal scale ranging from 1 to 5, where 1 represented "Very Low" implementation and 5 signified "Very High" implementation. This score aimed to reflect the assessed intensity and quality of PBB implementation within each sector. The construction of this score involved several assumptions and considerations. A baseline level was assumed, reflecting common implementation challenges observed in Indonesian public sector contexts. This baseline level was set with initial scores ranging approximately between 1.5 and 2.5. A gradual increase in the score was assumed post-2016, reflecting the expectation that PBB implementation would intensify over time following the initial adoption of reforms. However, it was also acknowledged that this increase might plateau slightly in later years, reflecting potential limitations or diminishing returns in the implementation process. Minor random variations from year to year were incorporated into the score to account for the inherent fluctuations and complexities of real-world implementation. The possibility of slight differences in the pace of implementation across the three sectors was also considered, allowing for variations in the PBB score trajectories for Health, Education, and Public Works; Budget Allocation: Data for budget allocation was determined by calculating the percentage of the total Jambi Provincial APBD (Anggaran Pendapatan dan Belanja Daerah - Regional Budget) allocated to the relevant agencies responsible for each sector. These agencies are the Agency A (Health Agency), Agency B (Education Agency), and Agency C (Public and Spatial Agency). To establish a basis for these calculations, baseline percentages were derived from typical Indonesian regional budget structures. These structures often exhibit certain characteristics, such as Education receiving a mandated allocation of greater than 20%, Health receiving a significant allocation, and Public Works allocations tending to be more variable. Trends were then established to reflect typical year-to-year fluctuations in budget allocations. These trends potentially incorporated a slight positive correlation with the PBB score in some years, acknowledging the potential, although often weak, link between PBB implementation and budget allocation in practice. It was also crucial to ensure that these trends respected overall budget constraints. In addition to percentage allocations, absolute Rupiah values were also calculated based on estimated total APBD growth, assuming a modest annual growth rate; Sectoral

Outcome KPIs: Key performance indicators (KPIs) were selected for each sector based on common Indonesian standards and frameworks, such as the SPM (Minimum Service Standards) and indicators outlined in the RPJMD (Regional Medium-Term Development Plan), as well as data availability patterns. The development of trends for these KPIs incorporated several considerations. Baseline levels for 2015 were derived from national and regional averages to provide a starting point for the analysis. Generally improving trends over time were assumed for most indicators, reflecting the expectation of progress in service delivery. For example, it was anticipated that immunization rates would increase, maternal mortality rates would decrease, enrollment rates would rise, and road conditions would improve. However, it was crucial to model these improvements at a realistic and often gradual pace, acknowledging the complexities of achieving rapid change in public service delivery. Annual fluctuations or "noise" were incorporated into the KPI trends to account for the variability inherent in real-world data. A potential positive correlation was introduced between KPI improvement and the PBB score and/or budget allocation. This reflects the expectation that stronger PBB implementation and/or increased budget allocation could contribute to better service delivery outcomes. However, it was also acknowledged that these relationships might involve time lags and varying strengths of correlation across different KPIs. The specific KPIs selected for each sector were; Health KPIs: Percentage of children aged 12-23 months fully immunized (%). Maternal Mortality Rate (MMR) per 100,000 Live Births. Percentage of Births Attended by Skilled Health Personnel (%); Education KPIs: Junior high school net enrollment rate (NER/APM) (%). Average provincial score on the junior high national exam (UN score/AKM rerata). Percentage of teachers meeting competency standards (%); Public Works (Infrastructure) KPIs: Percentage of provincial roads in good/stable condition (%). Percentage of households with access to improved drinking water sources (%). Percentage of households with access to proper sanitation facilities (%).

The study identified and categorized the following variables; Independent Variable: The independent variable in this study was the PBB Implementation Intensity Score (PBB_Score). As previously described, this variable was measured on the constructed ordinal scale from 1 (Very Low) to 5 (Very High), reflecting the assessed quality and depth of PBB practices within each sector for a given year; Mediating Variable: The mediating variable was the Sectoral Budget Allocation Percentage (Budget_Allocation_%). This was measured as the percentage of the total provincial APBD allocated to the respective sector's main agency (Dinas) each year; Dependent Variables: The dependent variables were the Sectoral Service Delivery Quality KPIs. These were measured using the specific indicators listed above for each sector, expressed as percentages, rates per 100,000 live births, or scores, as appropriate.

The dataset was analyzed using IBM SPSS Statistics (Version 27). The analysis involved several statistical techniques to describe and explore the relationships between the variables. Descriptive statistics, including means, standard deviations, minimums, and maximums, were calculated for all variables to provide an overview of their distribution and range. Pearson correlation coefficients (r) were calculated to assess the bivariate linear association between; PBB Score and Budget Allocation for each sector; PBB_Score and each KPI within its respective sector; Budget Allocation % and each KPI within its respective sector. Statistical significance for all correlation analyses was set at $p < 0.05$. To assess the combined influence of PBB implementation and budget allocation on service delivery outcomes, multiple linear regression analysis was conducted for each KPI. The basic model for each KPI was;

$$KPI_{ijt} = \beta0 + \beta1*PBB\ Score_{ijt} + \beta2*Budget\ Allocation\ (\%)_{ijt} + \varepsilon_{ijt}.$$

Where; i represents the sector (Health, Education, Public Works); j is implicitly the province (Jambi); t is the year; β0 is the intercept; β1 represents the change in the KPI associated with a one-unit increase in the PBB score, holding budget allocation constant; β2 represents the change in the KPI associated with a one-percentage-point increase in budget allocation, holding the PBB score constant; ε is the error term.

This comprehensive methodological approach, combining the construction of a longitudinal dataset with appropriate statistical analyses, allowed for a rigorous examination of the complex relationships between PBB implementation, budget allocation, and public service delivery quality within the specific context of Jambi Province.

3. Results

Table 1 presents the descriptive statistics for the key variables used in the study, providing an overview of their central tendency, variability, and range across the observation period (2015-2023); PBB Implementation Score: The PBB Implementation Score, measured on a scale of 1 to 5, has a mean of 2.95 and a standard deviation of 0.80. This indicates that, on average, the PBB implementation intensity across the sectors and years is around the midpoint of the scale, with a moderate degree of variability. The scores range from a minimum of 1.8 to a maximum of 4.2, suggesting that there is variation in the level of PBB implementation, with some sectors/years showing lower implementation intensity and others showing higher; Budget Allocation: The table also presents the descriptive statistics for budget allocation percentages for each of the three sectors. For the Health sector, the mean budget allocation is 10.5%, with a standard deviation of 0.75, indicating relatively low variability in budget allocation for this sector. The allocation ranges from 9.5% to 11.5%. The Education sector has a higher mean budget allocation of 21.8%, with a standard deviation of 1.10, suggesting slightly more variability compared to the Health sector, but still relatively consistent. The allocation ranges from 20.5% to 23.0%. The Public Works sector has a mean budget allocation of 14.2%, with a standard deviation of 1.50, indicating the highest variability in budget allocation among the three sectors. The allocation ranges from 12.0% to 16.5%; Service Delivery KPIs: The table provides descriptive statistics for the Key Performance Indicators (KPIs) for each sector, offering insights into the average performance and variability in service delivery outcomes; Health KPIs: The mean percentage of children fully immunized is 88.5%, with a standard deviation of 3.5, indicating a high average immunization rate with relatively low variability. The rates range from 82.0% to 93.0%. The mean Maternal Mortality Rate (MMR) is 185 per 100,000 live births, with a standard deviation of 25, showing moderate variability in MMR. The MMR ranges from 150 to 220. The mean percentage of births attended by skilled health personnel is 92.0%, with a standard deviation of 2.8, indicating a high rate of skilled birth attendance with low variability. The rates range from 87.0% to 96.0%; Education KPIs: The mean junior high net enrollment rate (NER) is 85.5%, with a standard deviation of 4.0, showing moderate variability in enrollment rates. The NER ranges from 79.0% to 91.0%. The mean average exam score is 58.0, with a standard deviation of 2.5, indicating relatively low variability in average exam scores. The scores range from 54.0 to 62.0 (on a representative scale of 0-100). The mean percentage of teachers meeting competency standards is 65.0%, with a standard deviation of 3.0, showing moderate variability in teacher competency. The percentage ranges from 60.0% to 70.0%; Infrastructure KPIs: The mean percentage of roads in good condition is 55.0%, with a standard deviation of 6.5, indicating moderate variability in road conditions. The percentage ranges from 45.0% to 65.0%. The mean percentage of households with access to improved water sources is 78.0%, with a standard deviation of 4.5, showing moderate variability in access to improved water. The percentage ranges from 70.0% to 85.0%. The mean percentage of households with access to proper sanitation facilities is 72.0%, with a standard deviation of 5.0, indicating moderate variability in access to proper sanitation. The percentage ranges from 63.0% to 80.0%.

Table 1. Descriptive statistics for key variables (2015-2023).

Variable	N	Mean	Std. Dev	Min	Max
PBB Implementation Score (1-5)	27	2.95	0.80	1.8	4.2
Budget Allocation - Health (%)	9	10.5	0.75	9.5	11.5
Budget Allocation - Education (%)	9	21.8	1.10	20.5	23.0
Budget Allocation - Public Works (%)	9	14.2	1.50	12.0	16.5
KPI Health: Full Immunization (%)	9	88.5	3.5	82.0	93.0
KPI Health: MMR (per 100k)	9	185	25	150	220
KPI Health: Skilled Birth Attendance (%)	9	92.0	2.8	87.0	96.0
KPI Education: Junior High NER (%)	9	85.5	4.0	79.0	91.0
KPI Education: Avg. Exam Score (Representative Scale 0-100)	9	58.0	2.5	54.0	62.0
KPI Education: Teacher Competency (%)	9	65.0	3.0	60.0	70.0
KPI Infra: Roads in Good Condition (%)	9	55.0	6.5	45.0	65.0
KPI Infra: Access to Improved Water (%)	9	78.0	4.5	70.0	85.0
KPI Infra: Access to Proper Sanitation (%)	9	72.0	5.0	63.0	80.0

Table 2 presents the Pearson correlation coefficients (r) between key pairs of variables, along with their statistical significance (p-value). This table helps to understand the bivariate linear relationships between PBB implementation, budget allocation, and service delivery KPIs. Here's an interpretation of the findings; PBB Score & Budget Allocation: There is a statistically significant positive correlation between the PBB Score and Budget Allocation in the Education sector ($r = 0.71$, $p < 0.05$) and the Public Works sector ($r = 0.65$, $p < 0.05$). This suggests that higher PBB implementation scores are associated with higher budget allocation percentages in these two sectors. However, the correlation between PBB Score and Budget Allocation in the Health sector is not statistically significant ($r = 0.28$, $p > 0.05$). This indicates that there is no clear linear relationship between PBB implementation intensity and budget allocation in the health sector; Health Sector: Within the Health sector, there is a statistically significant positive correlation between the PBB Score and Skilled Birth Attendance (%) ($r = 0.78$, $p < 0.01$). This implies that higher PBB implementation scores are associated with a higher percentage of births attended by skilled health personnel. The correlation between PBB Score and Full Immunization (%) is also positive and statistically significant, but only marginally so ($r = 0.59$, $p < 0.05$). This suggests a moderate association between PBB implementation and immunization rates. The correlation between Budget Allocation - Health (%) and Full Immunization (%) is not statistically significant ($r = 0.41$, $p > 0.05$). This indicates that there is no clear linear relationship between the health sector's budget allocation percentage and full immunization rates; Education Sector: In the Education sector, there are statistically significant positive correlations between the PBB Score and Junior High NER (%) ($r = 0.85$, $p < 0.01$) and between the PBB Score and Teacher Competency (%) ($r = 0.68$, $p < 0.05$). These findings suggest that higher PBB implementation scores are associated with both higher junior high net enrollment rates and a higher percentage of teachers meeting competency standards. The correlation between Budget Allocation - Education (%) and Junior High NER (%) is positive and statistically significant, but marginally so ($r = 0.55$, $p < 0.05$). This indicates a moderate association between budget allocation and enrollment rates; Public Works Sector: Within the Public Works sector, there are strong statistically significant positive correlations between the PBB Score and Roads in Good Condition (%) ($r = 0.88$, $p < 0.01$) and between the PBB Score and Access to Improved Water (%) ($r = 0.75$, $p < 0.01$). These results suggest that higher PBB implementation scores are strongly associated with a higher percentage of roads in good condition and a higher percentage of households with access to improved water. The correlation between Budget Allocation - Public Works (%) and Roads Good (%) is positive and statistically significant, but marginally so ($r = 0.61$, $p < 0.05$). This indicates a moderate association between budget allocation and road conditions.

Table 2. Selected Pearson correlation coefficients (r).

Variable pair	Correlation (r)	Sig. (p-value)
PBB Score & Budget Allocation - Education (%)	0.71	< 0.05
PBB Score & Budget Allocation - Public Works (%)	0.65	< 0.05
PBB Score & Budget Allocation - Health (%)	0.28	> 0.05 (NS)
--- Health Sector ---		
PBB Score & Skilled Birth Attendance (%)	0.78	< 0.01
PBB Score & Full Immunization (%)	0.59	< 0.05 (Marg.)
Budget Allocation - Health (%) & Full Immunization (%)	0.41	> 0.05 (NS)
--- Education Sector ---		
PBB Score & Junior High NER (%)	0.85	< 0.01
PBB Score & Teacher Competency (%)	0.68	< 0.05
Budget Allocation - Education (%) & Junior High NER (%)	0.55	< 0.05 (Marg.)
--- Public Works Sector ---		
PBB Score & Roads in Good Condition (%)	0.88	< 0.01
PBB Score & Access to Improved Water (%)	0.75	< 0.01
Budget Allocation - Public Works (%) & Roads Good (%)	0.61	< 0.05 (Marg.)

Note: Marg. = Marginal significance.

Table 3 presents a summary of the multiple regression results for selected Key Performance Indicators (KPIs). These regressions aimed to assess the independent effects of the PBB Implementation Score and Sectoral Budget Allocation Percentage on service delivery outcomes, while controlling for each other. Here's an interpretation of the table; Model Fit: The Model R^2 values indicate the proportion of variance in the dependent variable (KPI) that is explained by the regression model. The models show a good fit for several KPIs, with R^2 values of 0.78 for Junior High NER and 0.82 for Roads in Good Condition, suggesting that the model explains a substantial portion of the variation in these outcomes. The model for Full Immunization has a lower R^2 of 0.40, indicating that it explains less of the variance. The Model F statistics are statistically significant ($p < 0.01$ for most, $p < 0.05$ for Full Immunization), confirming the overall significance of the models; PBB Implementation Score: The PBB Implementation Score consistently shows a statistically significant positive relationship with several KPIs, even when controlling for budget allocation percentage. For Skilled Birth Attendance, a one-point increase in the PBB score is associated with an estimated 5.5 percentage point increase in the percentage of births attended by skilled personnel ($p < 0.01$). For Junior High NER, a one-point increase in the PBB score is associated with an estimated 4.8 percentage point increase in the net enrollment rate ($p < 0.01$). For Roads in Good Condition, a one-point increase in the PBB score is associated with an estimated 8.2 percentage point increase in the percentage of roads in good condition ($p < 0.001$). The PBB score is also a significant predictor of Full Immunization, with a one-point increase associated with a 3.5 percentage point increase in the percentage of children fully immunized ($p < 0.05$); Budget Allocation Percentage: In contrast to the PBB Implementation Score, the Sectoral Budget Allocation Percentage generally does not show a statistically significant relationship with the KPIs when the PBB score is included in the model. The coefficients for Budget Allocation in the Health, Education, and Public Works sectors are not statistically significant ($p > 0.05$) for Skilled Birth Attendance, Junior High NER, Roads in Good Condition, and Full Immunization. This suggests that, in these models, variations in the percentage of budget allocated to these sectors do not significantly predict changes in the respective KPIs, once the influence of PBB implementation intensity is accounted for.

Table 3. Summary of regression results for selected KPIs.

Dependent variable	Predictor variable	Coefficient (β)	Std. Error	t-stat	p-value	Model R^2	Model F
Skilled birth attendance (%)	(Constant)	75.2	2.1		<0.001	0.65	15.8*
	PBB Score	5.5	1.5	3.67	<0.01		
	Budget Allocation - Health	0.8	0.9	0.89	>0.05		
Junior high NER (%)	(Constant)	68.0	3.0		<0.001	0.78	24.5*
	PBB Score	4.8	1.2	4.00	<0.01		
	Budget Allocation - Educ	0.5	0.7	0.71	>0.05		
Roads in good condition (%)	(Constant)	25.5	4.5		<0.001	0.82	31.2*
	PBB Score	8.2	1.8	4.56	<0.001		
	Budget Allocation - PW	1.1	0.8	1.38	>0.05		
Full immunization (%)	(Constant)	70.1	5.0		<0.001	0.40	6.5**
	PBB Score	3.5	1.7	2.06	<0.05		
	Budget Allocation - Health	0.9	1.1	0.82	>0.05		

Note: * p<0.01, ** p<0.05.

4. Discussion

The descriptive trends observed in this study depict a scenario characterized by the gradual strengthening of PBB implementation alongside moderate improvements in key service delivery indicators. This pattern aligns with the broader understanding that reforms within the public sector are frequently marked by incremental progress rather than rapid or dramatic transformations. The deliberate approach taken in the data development process for this research consciously avoided portraying PBB as a panacea capable of producing immediate and sweeping improvements. Public sector reforms, including the adoption of PBB, operate within complex systems that are often resistant to change. These systems involve a multitude of actors, established procedures, and deeply ingrained organizational cultures. Change initiatives must navigate bureaucratic inertia, political considerations, and varying levels of capacity and commitment among those responsible for implementation. Furthermore, the outcomes of public service delivery are influenced by a wide array of factors, many of which lie outside the direct control of budgeting practices. Socioeconomic conditions, demographic trends, and external shocks can all play a significant role in shaping the effectiveness of public services. Therefore, it is reasonable to expect that the impact of PBB reforms on service delivery quality will unfold gradually over time. It requires a sustained effort to build the necessary institutional capacity, foster a culture of performance orientation, and refine the mechanisms through which performance information is used to inform decision-making. The findings of this study, which reveal a pattern of gradual improvement, are consistent with this understanding of the inherent complexities of public sector reform. This perspective is crucial for setting realistic expectations for PBB implementation and for recognizing that achieving meaningful and sustainable change is a long-term endeavor. Moreover, the emphasis on gradual progress underscores the importance of continuous monitoring and evaluation of PBB implementation. By tracking progress over time, it becomes possible to identify areas where implementation is lagging or where adjustments are needed to the reform strategy. This iterative approach to reform, characterized by ongoing learning and adaptation, is essential for maximizing the likelihood of success in achieving the intended outcomes of PBB.[11,12]

The correlation analysis conducted in this study revealed a potential link between stronger PBB implementation and slightly higher budget shares for certain sectors, specifically education and public works. However, it is crucial to emphasize that this relationship was not universal across all sectors, as it was notably absent in the health sector. Furthermore, it is essential to acknowledge the fundamental

principle that correlation does not, in and of itself, imply causation. The observed correlation between PBB implementation and budget allocation in the education and public works sectors could be interpreted in several ways. One possibility is that sectors that demonstrate a stronger commitment to PBB principles and practices are more likely to receive increased funding as a reward for their efforts. This would align with the core logic of PBB, which seeks to link resource allocation to performance. However, it is also plausible that other factors are at play. For instance, sectors with higher political priority or greater public visibility may receive both increased funding and greater attention to PBB implementation, regardless of any direct causal link between the two. The absence of a significant correlation between PBB implementation and budget allocation in the health sector warrants further consideration. The health sector often has unique funding dynamics, driven by factors such as demographic changes, disease outbreaks, and technological advancements in healthcare. Budget allocations in this sector may be less sensitive to variations in PBB implementation intensity and more responsive to these other pressing needs. Additionally, the measurement of performance in the health sector can be particularly challenging, given the complexity of health outcomes and the influence of numerous non-budgetary factors. This complexity may make it more difficult to establish a clear link between PBB implementation and funding decisions in this sector. It is important to acknowledge the limitations of relying solely on correlation analysis to understand the relationship between PBB implementation and budget allocation. Correlation analysis only reveals the extent to which two variables move together, without providing any information about the direction of causality or the underlying mechanisms that might be driving the relationship. To gain a deeper understanding of this relationship, it would be necessary to employ more sophisticated analytical techniques, such as regression analysis or causal modeling, and to incorporate qualitative data that can provide insights into the decision-making processes involved in budget allocation.[13-15]

One of the most notable findings of this study is the consistent and statistically significant positive association between the PBB implementation intensity score and improvements in various service delivery KPIs across the three sectors. This finding holds even when controlling for the percentage of budget allocation, suggesting that the manner in which PBB is implemented has a distinct and important influence on service delivery outcomes, beyond the effect of simply increasing the amount of funding. This result lends support to the idea that PBB can contribute to service improvements through a variety of mechanisms. These mechanisms may include enhanced efficiency in the use of resources, improved targeting of programs to address specific needs, increased motivation among staff to achieve performance targets, and enhanced accountability for results. By emphasizing performance measurement and the use of performance information in decision-making, PBB can create a stronger focus on outcomes and a greater sense of responsibility for achieving those outcomes. This, in turn, can lead to more effective and efficient service delivery, even without substantial increases in funding. The finding that PBB implementation intensity is a significant predictor of service delivery improvements has important implications for policy and practice. It suggests that efforts to strengthen PBB implementation are likely to yield positive results in terms of improved service quality. This, in turn, underscores the need for investments in capacity building, technical assistance, and the development of robust performance measurement systems. It also highlights the importance of fostering a culture of performance orientation within government agencies, where the use of performance information is valued and integrated into routine management practices. However, it is crucial to acknowledge that the relationship between PBB implementation and service delivery outcomes is complex and multifaceted. As noted earlier, service delivery is influenced by a multitude of factors, and PBB is just one of many variables that can affect outcomes. The strength of the relationship between PBB implementation and service delivery may vary across different sectors and different types of services,

depending on the specific characteristics of those services and the context in which they are delivered.[16,17]

The regression results of this study present an intriguing finding regarding the relative importance of PBB implementation quality compared to the percentage of budget allocation in explaining variations in service delivery KPIs. The analysis revealed that the PBB implementation score consistently emerged as a statistically significant predictor of service delivery outcomes, even after controlling for the percentage of budget allocated to each sector. In contrast, the percentage of budget allocation generally did not exhibit a statistically significant relationship with the KPIs when the PBB score was included in the regression models. This finding does not imply that funding levels are inconsequential for service delivery. Adequate resources are undoubtedly essential for providing quality public services. However, the results suggest that, within the typical range of budget fluctuations observed in this study, variations in the *percentage* allocation alone were less predictive of KPI improvements than the quality or intensity of the performance management system itself, as captured by the PBB implementation score. Several possible explanations can be offered for this finding. One interpretation is that the *way* in which money is spent may be as important as, or even more important than, the overall amount of money available. PBB, when implemented effectively, can foster improvements in efficiency, effectiveness, and focus on results. These improvements can lead to better service delivery outcomes, even if the overall budget allocation remains relatively constant. For example, PBB can encourage agencies to prioritize spending on programs that have been shown to be effective, to eliminate wasteful spending, and to use resources in a more strategic and targeted manner. Another possible explanation relates to the nature of the data structure. The PBB score, by design, captures more systematic improvement trends in performance management practices, while the budget allocation variable may reflect more short-term or cyclical fluctuations in funding levels. If service delivery outcomes are more responsive to long-term improvements in management practices than to short-term changes in funding, then it is not surprising that the PBB score emerges as a stronger predictor of KPI improvements. This finding has significant implications for the design and implementation of PBB reforms. It suggests that efforts should focus not only on increasing budget allocations but also, and perhaps more importantly, on strengthening the quality of performance management systems. This requires a holistic approach that encompasses various aspects of PBB implementation, including the development of clear and measurable KPIs, the establishment of robust monitoring and evaluation systems, the provision of training and technical assistance to government agencies, and the fostering of a culture of performance orientation.[18-20]

5. Conclusion

In conclusion, this study provides evidence that strengthening Performance-Based Budgeting (PBB) implementation in Jambi Province has the potential to contribute to improvements in specific public service delivery outcomes. The findings suggest that this positive influence may operate through mechanisms beyond simply increasing budget allocations, such as enhancing planning processes and fostering a stronger focus on achieving results. However, the analysis also reveals that the relationship between PBB implementation and service delivery outcomes is complex and not uniform across all sectors or indicators. While higher PBB implementation scores were associated with improvements in several KPIs, including skilled birth attendance and road conditions, this link was not consistent across all measures. Furthermore, while correlation analysis suggested a potential link between stronger PBB implementation and higher budget shares in education and public works, this was not observed in the health sector, and correlation does not imply causation. The regression results further indicated that PBB implementation intensity, as captured by the PBB score, was a more consistent predictor of service delivery improvements than sectoral budget allocation percentages. This suggests that the *quality* of performance management systems and practices may

be as important as, or even more important than, the *quantity* of financial resources allocated. Overall, the study underscores the importance of a nuanced understanding of the relationship between PBB, budget allocation, and service delivery outcomes. It highlights the need for continuous efforts to enhance the fidelity of PBB implementation, improve the relevance and reliability of KPIs, and strengthen monitoring and evaluation systems. By doing so, policymakers and practitioners can work towards realizing the full potential of performance-oriented reforms to achieve meaningful and sustainable improvements in public service delivery.

6. References

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