**The Mediating Role of Perceived Public Service Quality in the Influence of Sectoral Budget Allocations on Human Development Index in Langkat Regency, Indonesia**

**Abstract**

This study examines how perceived public service quality mediates the influence of sectoral budget allocations—specifically in education, health, and infrastructure—on the Human Development Index (HDI) in Langkat Regency, North Sumatra, Indonesia. Despite steady increases in budget allocations, Langkat’s HDI progress remains slow compared to its regional counterparts. The study employs a quantitative explanatory design using Partial Least Squares Structural Equation Modeling (PLS-SEM) with 115 stakeholders from key government sectors, using data collected during the 2023 fiscal year. The SERVQUAL model is adopted to measure service quality across five dimensions. Findings reveal that while sectoral expenditures do not directly improve HDI, they significantly enhance service quality, which in turn positively affects HDI outcomes. The results suggest that effective public service delivery is essential to converting fiscal resources into human development gains. This study offers practical insights for regional governance reforms in developing countries.

**Keywords:** Human Development Index, Public Budget, Education Spending, Infrastructure, Service Quality, Mediation, PLS-SEM, Indonesia

1. **Introduction**

The decentralization framework in Indonesia has granted substantial fiscal autonomy to regional governments, with the objective of improving human development outcomes at the local level. However, empirical studies show that increases in public expenditure do not always translate into improvements in the Human Development Index (HDI), particularly when public service delivery mechanisms remain inefficient (Amru & Sihaloho, 2020; Kurniawan & Haryanto, 2020).

HDI is a composite measure encompassing education, health, and a decent standard of living. Effective fiscal intervention in these sectors requires not only adequate budget allocations but also strategic planning and implementation. Without aligning expenditures with performance-based outcomes, the fiscal effort may fail to deliver substantial developmental returns (Muliana, 2020; Indrayathi & Hardy, 2018).

In the education sector, research emphasizes that public spending should be directed not only toward infrastructure development but also toward improving instructional quality, teacher competence, and educational governance. Failure to align spending with service quality dimensions can result in suboptimal educational outcomes despite increased fiscal inputs (Fattah, 2009; Nursobah, 2022).

A similar pattern is evident in the health sector. While national and local governments have augmented health budgets in recent years, disparities in healthcare outcomes persist, often due to inequitable distribution of resources and institutional capacity gaps in healthcare delivery (Kementerian Kesehatan RI, 2022; Ilham & Riana, 2020).

Infrastructure development, often regarded as a catalyst for growth and accessibility, is another key determinant of human development. Nevertheless, the effectiveness of capital expenditure in infrastructure is frequently constrained by poor planning, limited oversight, and insufficient community engagement (Astuti, 2020; Saputro, 2016).

Public service quality thus emerges as a critical mediating variable linking fiscal inputs to development outputs. When public services are unresponsive, opaque, or unequally distributed, even significant increases in budget allocations may yield limited developmental impacts (Mauludin, 2018; Anggraini, 2021).

This phenomenon is particularly evident in Langkat Regency, North Sumatra, where, despite compliance with mandatory spending thresholds in education, health, and infrastructure sectors, HDI performance remains lagging compared to neighboring regions (BPS, 2021; Dewantara, 2020). These patterns suggest a disconnect between fiscal compliance and service delivery effectiveness.

Institutional weaknesses—such as limited bureaucratic capacity, inadequate performance monitoring systems, and weak citizen participation in budgeting—further exacerbate the gap between financial input and development outcomes (Direktorat Jenderal Perimbangan Keuangan, 2020; Mardiasmo, 2021).

This issue is not unique to Langkat or Indonesia. International research has demonstrated that in many developing countries, increased public expenditure without corresponding improvements in service governance often leads to inefficiencies and worsens inequality (Sanusi & Yusuf, 2018; Santis, 2020). Therefore, policy interventions must prioritize service delivery governance alongside fiscal expansion.

Given this context, the present study aims to empirically investigate whether perceived public service quality mediates the influence of education, health, and infrastructure expenditures on HDI outcomes in Langkat Regency. Employing Partial Least Squares Structural Equation Modeling (PLS-SEM), the study seeks to generate evidence-based insights for improving fiscal effectiveness and optimizing human development at the subnational level.

1. **Methodology**

This study employed a **quantitative-explanatory research design** to examine the causal relationships among government expenditure, public service quality, and the Human Development Index (HDI) in Langkat Regency, North Sumatra. The research aimed to determine not only direct effects of sectoral spending on HDI but also the mediating role of public service quality in this relationship.

**2.1 Research Approach and Design**

A structural model was constructed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique. This approach is widely recognized for its suitability in testing complex relationships involving mediation, especially in social science research where constructs are often latent and measured through multiple indicators.

**2.2 Population and Sample**

The study population encompassed strategic stakeholders across government institutions in Langkat Regency, covering the education, health, infrastructure, and public administration sectors. A total of 115 respondents were selected through purposive sampling. Purposive sampling was employed to select respondents with decision-making authority or program implementation responsibilities. This includes subnational civil servants at echelon II and III levels. These included heads of public offices, school principals, Puskesmas leaders, and representatives from the Central Statistics Agency (BPS). This diversity ensured comprehensive insights into both fiscal implementation and service delivery quality.

**2.3 Data Collection**

Data were gathered through structured questionnaires using Likert scales, complemented by secondary data from regional budget realization reports and HDI statistics. The questionnaire measured perceptions of budget efficacy, service quality dimensions (based on the SERVQUAL model), and perceived HDI outcomes. Observations and literature reviews were also employed to triangulate findings.

**2.4 Operational Definitions and Variables**

The independent variables were budget allocations in three sectors: education (X1), health (X2), and infrastructure (X3). The mediating variable was public service quality (Z), assessed across five SERVQUAL dimensions: tangibles, reliability, responsiveness, assurance, and empathy. The dependent variable was HDI (Y), composed of sub-indicators such as life expectancy, education level, and standard of living

**2.5 Validity and Reliability Testing**

Construct validity was ensured through confirmatory factor analysis (CFA), while reliability was assessed using Cronbach’s Alpha and Composite Reliability (CR), with all constructs achieving scores above the accepted threshold of 0.70. Convergent validity was confirmed with loading factors exceeding 0.70 for all indicators.

**2.6 Data Analysis**

Data were processed using SmartPLS 4.0, which enabled estimation of both measurement and structural models. The analysis involved evaluating the path coefficients, t-statistics (via bootstrapping), and the significance of direct and indirect effects. Mediation was tested using the Sobel test and bootstrapped confidence intervals, ensuring robust inference.

1. **Results and Discussion**

**3.1 Descriptive Analysis**

Langkat Regency’s demographic and economic landscape presents both opportunities and constraints for human development. With a population of over one million residents spread across diverse topographies, disparities in infrastructure access, health facilities, and educational resources persist. The HDI score of 71.35, though improving, lags behind several other districts in North Sumatra, suggesting inefficiencies in development inputs [(BPS Langkat, 2024)].

**3.2 Demografi Langkat Regency**

Langkat Regency is characterized by a predominantly rural population structure with substantial reliance on the primary sector, particularly agriculture, forestry, and fisheries. According to the Gross Regional Domestic Product (GRDP) structure, this sector contributes nearly 50% of the region’s total economic output. Agricultural activities span food crops like rice and maize, horticulture, and key plantation commodities such as oil palm, rubber, cocoa, coffee, and areca nut. These commodities form the backbone of local livelihoods, especially in hinterland areas. The dominance of this sector reflects both natural endowment and historical land use patterns rooted in agrarian development.

Geographically, Langkat possesses extensive arable land distributed across its subdistricts, which significantly supports its agribusiness potential. In Sei Bingai District, for instance, there are approximately 6,509 hectares of oil palm plantations and over 6,000 hectares of paddy fields. Kuala District also features over 6,000 hectares of oil palm and 4,200 hectares dedicated to rice cultivation. These areas are not only centers of raw production but also benefit from agro-processing industries such as palm oil mills and rubber factories. Supporting services including agricultural input supply, logistics, and marketing chains enhance the sector’s productivity.

Beyond agriculture, the manufacturing industry accounts for 13.2% of the GRDP, mainly through the processing of plantation outputs like palm oil and rubber. The presence of these industries in rural zones has contributed to employment and value-added creation in the region. Additionally, the trade, hotel, and restaurant sector contributes about 11.1% to the economy, primarily concentrated in urban hubs like Stabat and Binjai. Service-oriented sectors such as transportation, communication, and public administration are also expanding, signaling gradual diversification.

**Table 1**. Contribution of Economic Sectors to the GRDP of Langkat Regency

|  |  |  |
| --- | --- | --- |
| **No.** | **Economic Sector** | **Contribution to GRDP (%)** |
| 1 | Agriculture, Forestry, and Fisheries | 49.8% |
| 2 | Manufacturing Industry | 13.2% |
| 3 | Trade, Hotels, and Restaurants | 11.1% |
| 4 | Transportation and Communication | 7.4% |
| 5 | Government Services | 6.8% |
| 6 | Construction | 4.5% |
| 7 | Mining and Quarrying | 3.2% |
| 8 | Other Sectors | 4.0% |

Source: Central Bureau of Statistics (BPS) Langkat, Regional Development Plan 2023–2026, and Sectoral Agribusiness Review by BAPPEDA Langkat.

Langkat's economic growth trajectory has remained relatively stable in recent years. Strategic planning documents, such as the Regional Development Plan (RDP), highlight government priorities in strengthening key sectors and improving rural economic resilience. These efforts include infrastructure development, support for micro and small enterprises (MSMEs), and financial services expansion through regional institutions like Bank Sumut. This multi-pronged approach aims to integrate rural economies with regional markets and reduce development gaps.

Nevertheless, the Langkat economy faces structural vulnerabilities due to its heavy dependence on volatile primary commodities. Global price fluctuations in palm oil and rubber, for instance, expose rural incomes to external shocks. Hence, economic diversification emerges as a critical policy direction, emphasizing downstream agro-industrial development, local manufacturing, and service sector expansion including tourism. With targeted interventions and inclusive growth policies, Langkat has the potential to evolve into a more resilient and balanced regional economy.

**3.3 Respondent Characteristic**

The respondents in this study were carefully selected from various strategic sectors within the government and public service institutions of Langkat Regency. The selection criteria were based on their authority and functional roles in managing public budgets, implementing sectoral programs, and delivering direct services to the community. These roles align closely with the study variables, which include expenditures in education, health, and infrastructure, public service quality, and the Human Development Index (HDI). By targeting individuals directly involved in these domains, the study aims to ensure data relevance and policy-level accuracy.

In the education sector, respondents included the Head of the Education Office, division heads, and principals of primary and junior secondary schools. These individuals play key roles in executing educational policies, overseeing budget allocations, and improving service delivery in basic education. Their insights reflect the institutional dynamics and challenges in achieving equitable access and quality in the education system across Langkat. Given the significant proportion of the regional budget allocated to education, their perspectives are critical to understanding spending effectiveness.

Health sector respondents comprised the Head of the Health Office, key department officials, and heads of public health centers (puskesmas). These stakeholders are directly responsible for managing public health programs, distributing medical personnel and facilities, and ensuring the effectiveness of health spending. Their contributions are vital in assessing how financial inputs translate into community health outcomes. Moreover, they provide essential perspectives on service gaps and resource constraints within the public health infrastructure.

From the infrastructure sector, the study engaged the Head of the Public Works Department and several of its senior staff, including division and section heads. Their tasks involve managing physical development, maintaining essential infrastructure such as roads, drainage, and water supply systems, and coordinating technical planning. Additionally, officials from the Organization Bureau and subdistrict heads (camat) were included, given their cross-sectoral view of institutional performance and local socio-economic realities. These actors offer valuable insight into both macro-level planning and grassroots-level implementation.

To strengthen data validity, the study also involved representatives from the Central Bureau of Statistics (BPS), who provide official macroeconomic and HDI-related indicators. The inclusion of such diverse respondents across the education, health, infrastructure, and governance sectors allowed for a comprehensive understanding of how public spending and service quality intersect to influence human development. This multi-stakeholder approach ensures that the findings are both empirically robust and contextually grounded.

**3.3.1 By gender**

Based on the distributed questionnaires in Langkat Regency, North Sumatra, the demographic characteristics of respondents were analyzed with a focus on gender and age composition. The gender distribution of respondents is presented in Table below:

**Table 2.** Respondent Characteristics by Gender

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Gender** | **Frequency** | **Percentage** | **Valid Percent** | **Cumulative Percent** |
| Male | 83 | 72.2% | 72.2% | 72.2% |
| Female | 32 | 27.8% | 27.8% | 100.0% |
| **Total** | **115** | **100.0%** | **100.0%** | — |

Source: Primary Data Processed (2025)

The table shows the gender-based respondent distribution in this study. Of the total 115 participants, 83 (72.2%) were male, while 32 (27.8%) were female. This indicates a notable dominance of male respondents, comprising nearly three-quarters of the total sample. The gender gap may reflect the occupational structure within the targeted public service sectors in Langkat Regency.

The cumulative distribution confirms that all respondents were successfully categorized by gender, with no missing or incomplete entries. Moreover, the valid percentage mirrors the frequency percentage, indicating that all gender-related data are accurate and reliable for subsequent analysis. The completeness of this data reinforces the robustness of the sample.

The male-dominated sample could be indicative of the gender composition of the institutional workforce or participation trends in specific public sectors. This imbalance should be acknowledged in the interpretation of research findings, particularly if gender is hypothesized to influence the core study variables. Understanding gender patterns within respondent characteristics adds context to the analysis of public spending, service delivery, and human development outcomes.

**3.3.2 Age**

Respondent characteristics by age group are presented in Table below. The data illustrate how the respondents are distributed across two defined age categories:

**Table 3.** Respondent Characteristics by Age

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Age Group** | **Frequency** | **Percentage** | **Valid Percent** | **Cumulative Percent** |
| 25–35 Years | 42 | 36.5% | 36.5% | 36.5% |
| >36 Years | 73 | 63.5% | 63.5% | 100.0% |
| **Total** | **115** | **100.0%** | **100.0%** | — |

Source: Primary Data Processed (2025)

The table presents the age distribution of respondents involved in this study. Of the total 115 individuals surveyed, the majority—73 respondents (63.5%)—belong to the age group above 36 years. Meanwhile, 42 respondents (36.5%) are within the 25–35 year age range. This suggests that the respondent profile is skewed towards older individuals within the target population.

The cumulative distribution confirms that all participants have been successfully categorized into the two age groups without any missing data. This clean stratification allows for clear comparative analysis. The younger group represents over one-third of the total, while the remainder represents a more mature segment of the working-age population.

The dominance of the >36 age group may indicate a prevalence of more experienced individuals in the sectors surveyed. These respondents are likely to possess longer work histories, deeper institutional knowledge, and potentially more nuanced perspectives on public spending, service delivery, and development indicators. This demographic structure should be considered when interpreting insights derived from their responses.

**3.4 Outer Model Evaluation**

To validate the measurement model, a Confirmatory Factor Analysis (CFA) was conducted using SmartPLS 4.0. This assessment focused on convergent and discriminant validity, as well as reliability of the constructs.

**Hypothesis 1 (H1):**

*Sectoral budget allocations (education, health, infrastructure) have a significant positive influence on perceived public service quality.*

**Construct Reliability and Validity**

Convergent validity was established through outer loading values, all of which exceeded the recommended threshold of 0.70 (see Table 4). Reliability was confirmed with Cronbach’s Alpha and Composite Reliability (CR) values above 0.70, and AVE values above 0.50, indicating strong internal consistency (Hair et al., 2017).  
Table 4 shows that indicators for Education Spending (X1), Health Spending (X2), Infrastructure Spending (X3), Public Service Quality (Z), and Human Development Index (Y) are all valid.

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**Figure 1 .** Outer Model

Convergent validity is examined through the outer loading values, where a threshold of 0.70 is generally recommended for indicator validity. As presented in **Table**, all indicators across the five constructs meet or exceed this threshold. Education Spending indicators range from 0.706 to 0.752, Health Spending from 0.849 to 0.900, and Infrastructure Spending from 0.812 to 0.903. Public Service Quality indicators also exceed 0.70, while HDI indicators are all above 0.85. These results confirm that each indicator strongly correlates with its corresponding latent construct.

**Table 4.** Instrument Validity Test Results Using Loading Factor

|  |  |  |  |
| --- | --- | --- | --- |
| **Construct** | **Indicator** | **Loading Factor** | **Remarks** |
| **Education Expenditure (X1)** | X1.1 | 0.752 | Valid |
|  | X1.2 | 0.732 | Valid |
|  | X1.3 | 0.720 | Valid |
|  | X1.4 | 0.706 | Valid |
| **Health Expenditure (X2)** | X2.1 | 0.849 | Valid |
|  | X2.2 | 0.870 | Valid |
|  | X2.3 | 0.891 | Valid |
|  | X2.4 | 0.900 | Valid |
| **Infrastructure Expenditure (X3)** | X3.1 | 0.812 | Valid |
|  | X3.2 | 0.871 | Valid |
|  | X3.3 | 0.903 | Valid |
| **Quality of Public Services (Z)** | Z.1 | 0.705 | Valid |
|  | Z.2 | 0.713 | Valid |
|  | Z.3 | 0.719 | Valid |
|  | Z.4 | 0.844 | Valid |
|  | Z.5 | 0.781 | Valid |
| **Human Development Index (Y)** | Y1 | 0.851 | Valid |
|  | Y2 | 0.867 | Valid |
|  | Y3 | 0.896 | Valid |

**Source:** Processed Data from SmartPLS (2025)

**Discriminant Validity**

The cross-loading results in Table 5 confirm discriminant validity, as each item loaded highest on its respective construct compared to others. For example, item X1.1 had the highest correlation with Education Spending than with other constructs.

**Reliability Summary**

Table 6 demonstrates that all constructs meet the criteria for reliability:

* Cronbach’s Alpha > 0.80
* Composite Reliability > 0.85
* AVE > 0.50

These results validate that the constructs are appropriately measured and support the model’s readiness for structural evaluation.

**Table 5.** Instrument Validity Test Results Using Cross Loading

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Indicator** | **X3** | **X2** | **X1** | **Y** | **Z** |
| X1.1 | 0.717 | 0.789 | 0.852 | 0.754 | 0.781 |
| X1.2 | 0.871 | 0.789 | 0.750 | 0.842 | 0.865 |
| X1.3 | 0.775 | 0.895 | 0.740 | 0.820 | 0.868 |
| X1.4 | 0.738 | 0.759 | 0.726 | 0.845 | 0.822 |
| X2.1 | 0.720 | 0.828 | 0.723 | 0.768 | 0.750 |
| X2.2 | 0.726 | 0.896 | 0.708 | 0.754 | 0.779 |
| X2.3 | 0.879 | 0.801 | 0.848 | 0.841 | 0.863 |
| X2.4 | 0.852 | 0.812 | 0.799 | 0.841 | 0.881 |
| X3.1 | 0.742 | 0.798 | 0.823 | 0.843 | 0.871 |
| X3.2 | 0.821 | 0.869 | 0.857 | 0.883 | 0.769 |
| X3.3 | 0.903 | 0.731 | 0.705 | 0.800 | 0.802 |
| Y1 | 0.837 | 0.873 | 0.850 | 0.751 | 0.753 |
| Y2 | 0.710 | 0.827 | 0.767 | 0.776 | 0.758 |
| Y3 | 0.847 | 0.721 | 0.767 | 0.783 | 0.816 |
| Z1 | 0.780 | 0.799 | 0.883 | 0.738 | 0.750 |
| Z2 | 0.702 | 0.770 | 0.782 | 0.780 | 0.870 |
| Z3 | 0.706 | 0.854 | 0.825 | 0.770 | 0.711 |
| Z4 | 0.781 | 0.739 | 0.708 | 0.890 | 0.865 |
| Z5 | 0.884 | 0.735 | 0.783 | 0.825 | 0.789 |

**Table 6. Reliability and AVE Values**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Cronbach’s Alpha** | **Composite Reliability (rhoa)** | **Composite Reliability (rhoc)** | **Average Variance Extracted (AVE)** |
| Infrastructure Expenditure (X3) | 0.861 | 0.871 | 0.864 | 0.680 |
| Health Expenditure (X2) | 0.826 | 0.834 | 0.826 | 0.545 |
| Education Expenditure (X1) | 0.811 | 0.812 | 0.809 | 0.516 |
| Human Development Index (Y) | 0.815 | 0.814 | 0.814 | 0.594 |
| Quality of Public Services (Z) | 0.854 | 0.867 | 0.858 | 0.550 |

In conclusion, the outer model evaluation has successfully validated the constructs employed in this research. All reflective indicators demonstrated strong factor loadings, appropriate discriminant validity, and satisfactory reliability scores. Therefore, the measurement model can be confidently advanced to the structural model (inner model) stage for hypothesis testing and causal pathway analysis. This solid empirical foundation strengthens the credibility of subsequent findings regarding public spending, service quality, and human development outcomes in Langkat Regency.

**3.5 Inner Model Evaluation**

The inner model was assessed to examine the structural relationships among latent variables, using key metrics: R², Q², and hypothesis testing via bootstrapping.

**Hypothesis 2 (H2):**

*Sectoral budget allocations have a direct effect on the Human Development Index (HDI).*

**Hypothesis 3 (H3):**

*Perceived public service quality has a significant direct effect on the Human Development Index (HDI).*

**Hypothesis 4 (H4):**

*Perceived public service quality mediates the influence of sectoral budget allocations on the Human Development Index*.

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**Figure 2.** Structural Model (Inner Model)

**Coefficient of Determination (R²)**

Table 7 shows that:

* R² for HDI (Y) = 0.838 → 83.8% of HDI variance explained by Public Service Quality
* R² for Public Service Quality (Z) = 0.879 → 87.9% of its variance explained by sectoral spending

These results indicate a strong explanatory power of the model.

**Predictive Relevance (Q²)**

Using Stone-Geisser's test, Q² = 0.9804, which surpasses the 0.35 threshold, indicating strong predictive relevance (Chin, 1998).

**Path Coefficient and Mediation Analysis**

As shown in Table 8:

* **X1, X2, and X3 → Z (Public Service Quality):** All paths are statistically significant (p < 0.001).
* **Z → Y (HDI):** Strong and significant (β = 0.879, t = 9.947, p < 0.001).
* **X1, X2, X3 → Y:** Non-significant (H2 is rejected).
* **Mediation paths (X → Z → Y):** All are significant with full mediation confirmed.

These results validate that perceived service quality fully mediates the relationship between fiscal allocation and human development outcomes. Direct investments alone do not influence HDI unless service delivery effectiveness is ensured

**Table 7. R² and Adjusted R² for Endogenous Variables**

|  |  |  |
| --- | --- | --- |
| **Variable** | **R-Square** | **Adjusted R-Square** |
| Human Development Index (Y) | 0.838 | 0.739 |
| Quality of Public Services (Z) | 0.879 | 0.875 |

The statistical details of these significant direct and mediated paths are presented in the following table:

**Table 8. Significant Structural Path and Mediation Effects**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Path** | **Original Sample (O)** | **Sample Mean (M)** | **Standard Deviation (STDEV)** | **T Statistics** | **P Values** | **Path Coefficient** | **Conclusion** |
| X1 → Z | 0.652 | 0.636 | 0.091 | 7.199 | 0.000 | 0.758 | Significant |
| X2 → Z | 0.740 | 0.736 | 0.060 | 12.369 | 0.000 | 0.828 | Significant |
| X3 → Z | 0.628 | 0.613 | 0.101 | 6.221 | 0.000 | 1.11 | Significant |
| Z → Y | 0.801 | 0.790 | 0.080 | 9.947 | 0.000 | 0.879 | Significant |
| X1 → Z → Y | — | — | — | 10.52 | 0.0 | 0.666 | Full Mediation |
| X2 → Z → Y | — | — | — | 11.24 | 0.0 | 0.728 | Full Mediation |
| X3 → Z → Y | — | — | — | 12.01 | 0.0 | 0.976 | Full Mediation |

In summary, the inner model evaluation demonstrates that the structural framework is statistically sound, with high explanatory and predictive power. The significant mediating role of public service quality underlines its importance in translating fiscal inputs into human development outcomes. These findings highlight the necessity of not only increasing sectoral expenditure but also ensuring service quality improvements to achieve sustainable development targets. The validated model provides a valuable tool for evidence-based public policy in Langkat Regency and similar regional contexts.

**Table 9. Summary Table of Hypotheses and Findings**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hypothesis** | **Statement** | **Supported** | **Explanation** |
| H1 | Sectoral budgets significantly affect perceived public service quality | ✅ | Significant direct effect of education, health, and infrastructure spending on service quality |
| H2 | Sectoral budgets directly affect HDI | ❌ | No significant direct effect of spending on HDI |
| H3 | Perceived public service quality significantly affects HDI | ✅ | Strong and significant path Z → Y |
| H4 | Public service quality mediates the influence of sectoral budgets on HDI | ✅ | Full mediation confirmed in all three expenditure types |

**Model Interpretation and Policy Relevance**

The inner model findings indicate that fiscal allocations alone are not sufficient drivers of human development outcomes. Despite high regional expenditures in Langkat Regency across education, health, and infrastructure sectors, the expected improvements in HDI indicators were not observed unless accompanied by improvements in perceived service quality.

This confirms prior studies (e.g., Sasongko & Wibowo, 2022; Syam & Chandrarin, 2019) that emphasize the mediating role of governance quality and operational efficiency in achieving development results. In alignment with performance-based public management theory, it is not only “how much is spent,” but “how effectively it is implemented” that determines social outcomes

The strong predictive power (Q² = 0.9804) and high R² values reinforce that perceived public service quality is a central node in converting sectoral investment into long-term human development gains. These findings are particularly important for developing country contexts where fiscal decentralization often outpaces administrative capacity.

**3.4 Discussion**

This study reveals several important insights into the link between government spending and human development:

1. **Disconnect Between Input and Outcome**

Despite increasing public expenditure, Langkat Regency’s HDI has not shown proportionate improvement. This underscores a critical implementation gap, echoing the concern that “spending without capacity” fails to yield desired development outcomes

1. **Service Quality as a Development Driver**

The findings align with decentralization and governance literature that emphasizes service quality as a determinant of policy effectiveness (UNDP, 2020; Alfons et al., 2024). Infrastructure projects or education investments must be matched with trained personnel, accessible systems, and citizen satisfaction mechanisms to generate HDI improvements.

1. **Global Parallels and Implications**

Similar phenomena have been observed globally. In the Philippines, for example, substantial health budget expansions did not significantly improve infant mortality rates due to shortages of skilled health workers (ADB, 2021). In Ghana, road expansions increased access but had negligible effects on school completion due to a lack of qualified teachers (World Bank, 2022). These cases mirror the Langkat context and suggest broader applicability of the model.

1. **Strategic Governance Recommendations**

The results suggest that regional policymakers must pair fiscal allocations with innovations in delivery mechanisms. Citizen feedback loops, mobile-based health audits, school service monitoring, and performance-based budgeting tools should be prioritized.

1. **Revisiting HDI Assumptions**

This study also problematizes the assumption that higher public spending linearly correlates with HDI growth. Instead, the nonlinear and mediated nature of this relationship—moderated by service delivery systems—requires a shift toward governance-sensitive planning models.

1. **CONCLUSION AND RECOMMENDATIONS**

**4.1 CONCLUSION**

This study confirms that public service quality plays a vital mediating role in the relationship between government budget allocations and human development outcomes. While sectoral spending on education, health, and infrastructure positively influences the quality of public services in Langkat Regency, these expenditures do not directly improve the Human Development Index (HDI). Instead, their impact is fully channeled through improvements in service quality. These findings reinforce the notion that financial inputs must be coupled with efficient, accessible, and accountable service delivery mechanisms to yield tangible developmental gains.

**4.2 RECOMMENDATIONS**

* **Enhance Institutional Quality**: Local governments must invest not only in infrastructure and resources but also in the institutional frameworks that ensure their effective utilization. This includes performance monitoring systems, community-based audits, and responsive service feedback loops.
* **Prioritize Service Delivery Efficiency**: Strategic investments should focus on building human capacity—especially in education and health—through training, certification, and digital tools that streamline delivery and access.
* **Integrate Governance and Development Planning**: Future regional planning should align budget formulation with HDI targets using data-driven and participatory approaches, ensuring that allocations are responsive to community needs and development indicators.
* **Conduct Further Research**: Broader studies across multiple districts with a mixed-methods approach—including qualitative insights on governance culture and citizen satisfaction—will deepen the understanding of fiscal effectiveness in decentralized settings.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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