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Value for Money Analysis of the Research Budget tt INCT- Timor-Leste (2021–2024): An Impact-Based Budgeting Approach

Augusto da Conceição Soares[1]; José Honório da Costa Pereira Jerónimo[2]; José Cornélio Guterres[3]; Valentim Ximenes[4]

[1] Institute of Business (IOB), Timor-Leste
[2'4] Universidade Nacional Timor Lorosa'e (UNTL), Timor-Leste
[3] Universidade da Paz (UNPAZ), Timor-Leste

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Abstract

This study evaluates the budget performance of research programs at the National Institute of Science and Technology (INCT) Timor-Leste for the period 2021–2024 using the Value for Money (VfM) framework. While previous research highlights high administrative budget absorption, the link between financial inputs and policy outcomes remains under-analyzed. This research employs a descriptive quantitative approach, integrating internal financial records totaling $233,500 and survey responses from 72 strategic stakeholders to contextualize performance within an average negative budget growth rate of -14.03%. The findings reveal an 'Excellent' VfM performance across all dimensions. In terms of Economy, INCT demonstrates institutional resilience by reducing the average unit cost per research project by 27.7%, successfully optimizing limited resources. Efficiency is evidenced by an average budget absorption rate of 94.15%, which transforms into 139 tangible products, including 50 final research reports and 89 dissemination activities. Furthermore, the effectiveness analysis confirms INCT's role as a primary provider of evidence-based insights, with a majority of stakeholders confirming the direct integration of research findings into decision-making. INCT successfully transitions toward a result-oriented management model that supports the 'Institutional Framework' pillar of the Timor-Leste Strategic Development Plan (PEDN) 2011–2030. This study proves that fiscal contraction does not necessarily impede scientific utility when coupled with institutional resilience. The study recommends the establishment of a Digital Knowledge Management System and a stable funding model to ensure long-term scientific innovation and evidence-based governance.

Keywords: *Money Analysis; Research Budget; INCT- Timor-Leste*

I. INTRODUCTION

Timor-Leste is currently on a strategic path toward becoming an upper-middle-income country by 2030. This vision is enshrined in the **Strategic Development Plan (PEDN) 2011-2030**, which focuses on five key sectors: Social Capital, Infrastructure, Economic Development, Institutional Framework, and

Macroeconomics.To achieve these targets, the Government of Timor-Leste is committed to strengthening its budget management system through the **Program-Based Budgeting (PBB)** approach, which was piloted in 2021 and fully implemented in 2022. This approach aims to allocate financial resources directly to outcomes and outputs aligned with national priorities.

The **National Institute of Science and Technology (INCT)**, as a public institution with administrative and scientific autonomy under **Decree-Law No. 5/2023**, plays a vital role in advancing science and technology. In line with the PEDN mission, INCT is tasked with generating practical knowledge to enhance the population's welfare. However, in its execution, INCT has faced significant fluctuations in budget allocation. Previous data indicates that the INCT budget fluctuated from $573,591 in 2021 to $552,177 in 2023 **[15]**.

The primary problem identified is the lack of a comprehensive evaluation regarding the effectiveness of research budget absorption and its impact on national policy. Although administrative budget absorption is reported to be very high (reaching **96.93%** in 2023), the substantive effectiveness of the total research investment of **$233,500** during the 2021-2024 period needs to be proven through the **Value for Money (VfM)**framework.

An interesting phenomenon was discovered in INCT's research budget management during 2021-2024. Despite the reduction in budget allocation, INCT demonstrated resilience by maintaining the productivity of its research outputs. The investment trends are presented in the following table:

Table 1.1: Comparison of Total Budget Trends and INCT Research Performance (2021-2024)

Year	Total INCT Budget (Soares et al., 2025)	Research-Specific Budget (Internal Data)	Output Quantity (Research Reports)	Unit Cost per Research Project
2021	$573,591	$83,500	16	$5,218
2022	$490,824	$60,000	12	$5.000
2023	$552,177	$41,500	11	$3,772
2024	$720,105	$48,500	11	$4,409
Total		**$233,500**	**50**	**$4,670 (Avg)**

The data above reveals a compelling phenomenon in INCT's research management: while the research budget was slashed by nearly **50%** between 2021 and 2023 (from $83,500 to $41,500), the institution successfully reduced the unit cost per research project by **27.7%** (from $5,218 to $3,772) while maintaining output quantity. This indicates that INCT has achieved significant resource optimization (**Economy**) and sharp productivity (**Efficiency**) despite severe fiscal constraints.

This shift toward Program-Based Budgeting in Timor-Leste necessitates a transition from traditional 'expenditure-tracking' to a more sophisticated **Impact-Based Budgeting Approach**. While administrative compliance is evident through high absorption rates, the true measure of INCT's accountability lies in its ability to translate every dollar spent into substantive policy utility. Without a **Value for Money (VfM)** evaluation, there is a risk that budget fluctuations may be misinterpreted as a decline in institutional relevance, rather than a catalyst for efficiency. Therefore, this study is critical to validate that INCT's research is not merely an administrative expense, but a high-return investment—**managed Economically, Efficiently, and Effectively**—that serves as a vital foundation for the state's decision-making process."

A. Problem Formulation

Based on the background above, the research questions are as follows:

1. How is INCT's **Economic** performance in managing the unit cost per research project during the 2021-2024 period?
2. To what extent is the **Efficiency** of INCT's program budget absorption, referring to the standards of Mardiasmo (2007) and Soares et al. (2025)?
3. How is the **Effectiveness** (impact) of INCT's research findings on government decision-making (under the Institutional Framework pillar of PEDN)?

B. Research Objectives

1. To analyze the level of **Economy** in the utilization of the $233,500 research budget.
2. To evaluate INCT's **Operational Efficiency** in achieving research output and dissemination targets.
3. To measure the percentage of **Policy Impact** resulting from research outputs as tangible evidence of Value for Money.

C. Research Significance

- **For INCT Management:** As a strategic advocacy tool to demonstrate institutional accountability and strengthen future research budget negotiations.
- **For the Government of Timor-Leste:** Providing **evidence-based proof** that investment in science and technology yields substantive policy returns for national development.
- **For Academics and Future Researchers:** To enrich the literature on public sector financial management and **Impact-Based Budgeting** in Timor-Leste following the full implementation of Program-Based Budgeting.

II. LITERATURE REVIEW

A. National Strategic Development Plan (PEDN) 2011-2030

The PEDN serves as Timor-Leste's long-term development framework aimed at transforming the nation into an upper-middle-income country by 2030. Its strategic foundation rests upon four pillars: Social Capital, Infrastructure, Economic Development, and Institutional Framework. In alignment with OECD recommendations, the government has implemented **Program-Based Budgeting (PBB)** to ensure that every fiscal allocation is directly synchronized with these strategic objectives.

B. Concept of Program-Based Budgeting (PBB) and Modern Reform

According to **Pollitt (2004)**, program-based budgeting shifts the focus from rigid, traditional line-item approaches to a result-oriented methodology. This concept is further expanded by **Pollitt & Bouckaert (2011)** in the context of modern public management reform. They argue that successful institutional reform is characterized by a transition from "input-based" bureaucracy (focusing on budget consumption) to **"result-oriented management,"** where performance is measured by the quality and utility of outputs and outcomes. This framework is essential for institutions facing fiscal constraints, as it prioritizes strategic value creation over mere administrative expenditure.

C. Value for Money (VfM) Framework

In the context of public sector performance, the definition of Value for Money (VfM) goes beyond simple cost-cutting. According to the **National Audit Office (NAO, 2010)**, VfM is not about achieving the

lowest cost, but about the "utilization of resources in a way that maximizes value." This is achieved through the **"3E" pillars**:

1. **Economy:** Minimizing the cost of resources used for an activity (spending less).
2. **Efficiency:** The relationship between outputs and the resources used to produce them (spending well).
3. **Effectiveness:** The extent to which objectives are achieved and the relationship between the intended impact and the actual impact of an activity (spending wisely).

As the cornerstone of performance measurement, **Jones & Pendlebury (2010)** further emphasize that VfM focuses on the relationship between resources, delivery, and outcomes. In this study, the 3Es are operationally defined through the optimization of **unit costs** (Economy), **budget absorption** (Efficiency), and **policy impact rate** (Effectiveness).

D. Measuring Budget Absorption Effectiveness

Mardiasmo (2009) defines a budget as a performance estimation statement to be achieved. The effectiveness of budget absorption is a measure of an organization's success in realizing financial plans to fund work programs. Research by **Soares et al. (2025)** utilizes the effectiveness formula to demonstrate that INCT maintains a remarkably high absorption rate (96.93% in 2023), which serves as a prerequisite for organizational efficiency. Furthermore, Soares (2025) emphasizes that high budget absorption ensures the optimal utilization of national resources, provided the spending aligns with national priorities.

E. Impact Evaluation and Evidence-Based Policy

According to **Rossi, Lipsey, & Freeman (2004)**, impact evaluation assesses the extent to which a program produces the desired changes in its intended target population. In a research ecosystem, impact is measured not merely by the volume of publications but by its **substantive utility**.

This process of research utilization is defined by **Nutley et al. (2007)** as the effective integration of scientific evidence into public services, which occurs when research actively informs and shapes the practical perspectives of policymakers. Furthermore, **Parkhurst (2017)** emphasizes that the ultimate effectiveness of a research institution lies in the **"Good Governance of Evidence."** This concept suggests that policy impact is achieved when evidence is systematically utilized to ensure that public policy is rigorous, transparent, and evidence-based, fulfilling the Institutional Framework pillar of the PEDN 2011-2030.

F. Budget Growth Rate

Abdul Halim (2012) states that the budget growth rate is an indicator that reflects the dynamics of an organization's financial capacity over time. Analyzing this growth is crucial for identifying trends in government fiscal support. Theoretically, consistent budget growth reflects the government's level of trust in the organization's performance. For INCT, the research budget growth rate serves as a determining factor in expanding the reach of scientific dissemination and funding strategic programs that create a multiplier effect for national technological advancement.

III. CONCEPTUAL FRAMEWORK

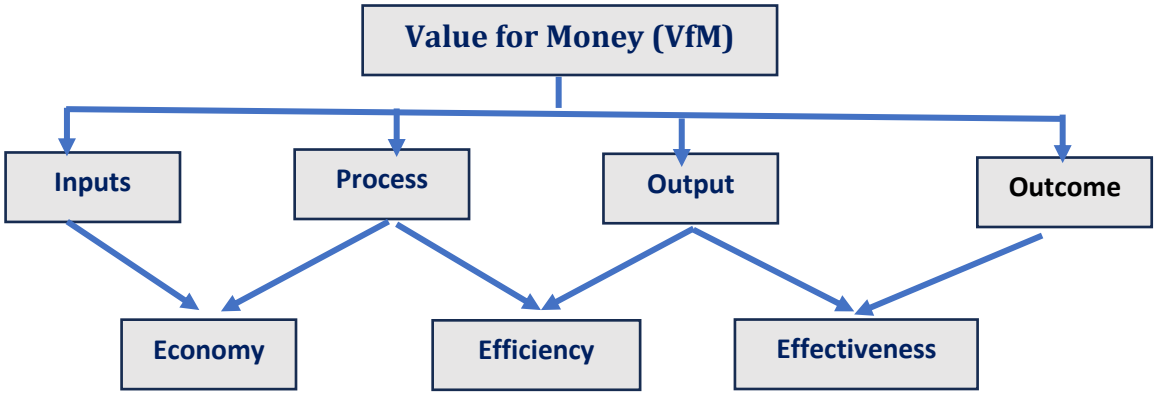

Figure 1. Conceptual framework

A. Description of the Conceptual Framework

Based on Figure 3.1, the conceptual framework of this study is constructed by integrating the strategic management workflow with the principles of **Value for Money (VfM)** to analyze the financial performance of the **Instituto Nacional de Ciência e Tecnologia (INCT)**. To achieve a strategic objective, Value for Money is a concept of managing public sector organizations based on three main elements: economy, efficiency, and effectiveness. The explanation of each element is as follows:

1. Input Stage (Strategic & Economic Foundation) The initial stage of the budget cycle begins with the identification of funding sources and the legal frameworks governing budget preparation. In accordance with the **Economy** principle of the Value for Money (VfM) framework, INCT's budget input does not stand alone but refers to national strategic documents such as the **Plano Estratégico de Desenvolvimento Nacional (PEDN 2011–2030)** and **Sustainable Development Goals (SDGs/ODS)**,. This ensures that the total research budget allocation of **$233,500** is not merely an administrative expenditure but a targeted investment.

2. Process Stage (Financial Management & Efficiency) The transformation of inputs into results is carried out through **Budget Execution** at INCT. At this stage, the principle of **Efficiency** is emphasized through the analysis of the **Budget Growth Rate**. This indicator serves to observe the consistency and capacity of the organization in managing the increase or decrease of fund allocations from year to year, reflecting the extent to which the institution is able to optimize existing resources.

3. Output & Analysis Stage (Results & Effectiveness) Output & Analysis Stage (Effectiveness & Results): Results are evaluated using the Effectiveness Ratio, comparing actual realization against targets set in the *Jornada Orçamento*. This pillar analyzes whether the 50 research reports and 89 dissemination activities meet the institutional standards of productivity

4. Outcome Stage (Substantive Utility & Policy Impact): The culmination of this framework is the assessment of INCT's Financial Performance through its Policy Impact. This stage measures the "Evidence-Based Insights" (referencing Nutley et al., 2007), determining if the financial management provides added value to national governance and scientific advancement.

5. Research Logic Model

The integration of the stages of the value for money is summarized in the following Research Logic Model:

1 **Input:** Total research budget allocation of **$233,500**.
2 **Process:** Execution of research activities and **89 dissemination activities**.
3 **Output:** Production of **50 final research reports** (*Relatório Final*).
4 **Outcome:** Realized **Policy Impact** on government decision-making.

IV. RESEARCH METHODOLOGY

A. Research Design

This study employs a **descriptive quantitative** approach, employing the **Value for Money (VfM)** evaluation method as its core analytical framework. This design was strategically chosen to comprehensively analyze institutional financial performance across its three fundamental pillars: economy, efficiency, and effectiveness. By adopting this quantitative design, this study aims to provide an objective, data-driven overview of budget management and public accountability at the **National Institute of Science and Technology (INCT)** for the period 2021–2024. This analysis allows for a rigorous assessment of how fiscal resources are converted into substantive scientific and policy outcomes, particularly following the full implementation of **Program-Based Budgeting (PBB)** in Timor-Leste.

B. Research Location and Timeline

The research was conducted at the **National Institute of Science and Technology (INCT)** in Dili, Timor-Leste. As a public institution with administrative and scientific autonomy under **Decree-Law No. 5/2023**, INCT serves as the primary gateway for scientific development and evidence-based policy in the nation.

C. Population and Sample

The **first population** in this study is the **institutional fiscal data**.

- **Population:** The entire record of research budget allocations and final research reports at **INCT** for the 2021–2024 period.
- **Total Scope:** This encompasses a total budget of **$233,500** and **50 final research reports**.
- **Sampling Method:** For the financial analysis (Economy and Efficiency), this study uses **saturated sampling (census)**, meaning the entire population of financial data is analyzed to provide a total overview of budget absorption.

The second population focuses on the **users of the research outputs** (the people who receive the research findings).

- **Population:** The total number of high-level stakeholders within the Timor-Leste government and academic institutions who were the recipients of INCT's research dissemination between 2021 and 2024.
- **Sampling Method:** From this population, a **Purposive Sampling** technique was applied. This method was chosen to ensure that only individuals with direct relevance to the research topics—specifically those from ministries and local government offices corresponding to the research sites—were included.
- **Sample Size:** A total of **72 strategic respondents** were selected. These respondents represent the primary "knowledge consumers" who have the authority to translate INCT's research into actual government policy.

The selection of these 72 stakeholders was specifically tied to the **50 Final Research Reports** produced during the 2021–2024 period. This ensures that the evaluation of effectiveness is grounded in the actual consumption and utilization of INCT's institutional outputs by the state's strategic decision-makers

D. Data Sources

This study integrates two types of data to ensure the validity of the results:

- **Secondary Data:** INCT internal documents, including Budget Realization Reports, 50 Final Research Reports, and comparative data from **Soares et al. (2025)** regarding budget growth rates.
- **Primary Data:** Data obtained through the final report of the "Policy Impact Survey" distributed to the 72 stakeholders to measure the substantive utility of the research.

E. Data Analysis Techniques (VfM Framework)

To provide a comprehensive evaluation, this study first applies **Budget Growth Analysis** to map the fiscal landscape of INCT. This serves as a contextual foundation for the subsequent **Value for Money** analysis, specifically in determining how budget contractions influence the institution's **Economy** and **Efficiency** in producing scientific outputs. Before conducting a Value for Money analysis, this study first calculated the Budget Growth Rate to understand the dynamics of the institution's financial capacity. This is essential for contextualizing how INCT responds to fiscal fluctuations.

1. Budget Growth Analysis in Public Institutions

According to Abdul Halim's theory (2012), growth is calculated by comparing the current year's budget with the previous year:

- **Formula for Budget Growth:**

$$\text{Budget Growth Rate} = \frac{(\text{Budget}_{n} - \text{Budget}_{n-t})}{\text{Budget}_{n-t}} \times 100\%$$

Budget $_{n}$: Research budget for the current year.
Budget $_{n-t}$: Research budget for the previous year.

2. The analysis of financial and program performance is based on The 3Es pillars:

A. Economy Analysis Assesses the optimization of input costs. The focus is on calculating the **Unit Cost** per research project to identify cost-efficiency trends over the years.

- **Formula:**

$$\text{Unit Cost} = \frac{\text{Total Research Budget Realization}}{\text{Total Research Outputs (Reports)}}$$

3. Efficiency Analysis Evaluates the productivity relationship between inputs (funds) and outputs (results). The efficiency level is measured by the budget absorption ratio, referring to **Mardiasmo's (2007)** standards:

Formula:

$$\text{Absorption Effectiveness} = \frac{\text{Actual Realization}}{\text{Budget Target}} \times 100\%$$

Interpretation Criteria: Interpretation Criteria:

- **90% – 100%:** Highly Efficient
- **80% – 89%:** Efficient
- **60% – 79%:** Moderately Efficient
- **< 60%:** Inefficien

4. **Effectiveness Analysis** Effectiveness evaluates the achievement of program **Outcomes** and their impact on the target population. In this study, effectiveness is measured by the **Policy Impact Rate**, which quantifies the substantive utility of INCT's research in government decision-making processes. Based on the evaluation theory of **Rossi, Lipsey, & Freeman (2004)**, the calculation is as follows:

Formula:

$$\text{Impact Rate} = \frac{\text{Number of Respondents Utilizing Research}}{\text{Total Sample (72)}} \times 100\%$$

V. RESULTS AND DISCUSSION

A. Research Results

1. Analysis of Budget Growth Trends and Institutional Adaptability

The analysis of the budget growth rate provides a critical dimension to evaluating INCT's performance. During the 2021–2024 period, INCT operated within a **Fiscal Contraction Phase**, yet managed to maintain stable scientific output.

Table 5.1.1 Results of Budget Growth Analysis

Year	Research Budget Allocation	Annual Growth Rate (%)	Contextual Analysis
2021	$83,500	-	Baseline Year
2022	$60,000	-28.14%	Initial Contraction
2023	$41,500	-30.83%	Peak Austerity
2024	$48,500	+16.87%	Recovery Phase
Total	**$233,500**	**-14.03% (Avg.)**	**Overall Negative Trend**

2. Value for Money (VfM) Performance Evaluation

1. Economic Analysis (Spending Less)

The economy analysis focuses on input optimization. By producing 50 research reports with a total budget of $233,500, the unit cost is calculated as follows:

$$\text{Unit Cost} = \frac{\$233.500}{50 \text{ Research Outputs}} = \$\ 4.670$$

2. Efficiency Analysis (Spending Well)

Efficiency is measured by the absorption rate of Program-Based Budgeting (PBB). Referring to **Mardiasmo (2007)** standards and **Soares et al. (2025)** data:

- 2021: **89.70%** (Effective)
- 2022: **95.98%** (Highly Effective)
- 2023: **96.93%** (Highly Effective)
- **Average Absorption: 94.15%**

3. Efectiveness Analysis (Effectiveness) Effectiveness measures the achievement of policy outcomes based on a survey of 72 respondents:

$$\text{Impact Rate} = \frac{\text{42 Respondents Utilizing Research}}{\text{Total Sample (72)}} = 58{,}33\%$$

- **Information Impact (61.11%):** 44 respondents confirmed that INCT's research fulfilled their institutional knowledge needs.
- **Policy Impact (58.33%):** 42 respondents confirmed that research outputs were utilized as a foundation for government decision-making.

The analysis reveals a **minimal gap of only 2.78%** between information reception (61.11%) and policy application (58.33%). This indicates a high **conversion rate**; once a stakeholder receives INCT's data, it is almost certain to be integrated into national governance processes. This aligns with **Nutley et al. (2007)**, where research actively informs and shapes the practical perspectives of policymakers.

B. Discussion

The evaluation of INCT's performance is structured around the **Value for Money (VfM)** framework, which serves as the gold standard for assessing public sector efficiency. As defined by the **National Audit Office (NAO, 2010)**, VfM is the optimal use of resources to achieve intended outcomes, categorized into three critical dimensions: **Economy** (spending less), **Efficiency** (spending well), and **Effectiveness** (spending wisely). By applying this framework, this study ensures a rigorous and objective assessment of how INCT managed its **$233,500** budget amidst fiscal constraints.

1. Economic Achievement: Optimizing Research Costs

The analysis of the economy dimension reveals that **INCT** has successfully implemented a strategic cost-optimization model. Empirical data indicates that the institution reduced the average cost per research project by **27.7%**, decreasing from **$5,218** in 2021 to **$3,772** in 2023. This reduction was achieved without compromising the quality or quantity of scientific outputs, demonstrating a high level of **Institutional Resilience**. Notably, despite a nearly **50% contraction** in the allocated research budget falling from **$83,500** in 2021 to **$41,500** in 2023 the institution maintained its productivity levels.

Comparison with Soares et al. (2025) and Theoretical Framework: While **Soares et al. (2025)** primarily focused on the macro-dynamics of the total institutional budget, this study identifies a specific "Doing More with Less" phenomenon within the research sector. This ability to optimize unit costs while sustaining output quality confirms a **Highly Economical** performance. Such performance is a direct reflection of superior internal financial control and strategic resource allocation.

This finding is strongly supported by the framework of **Jones & Pendlebury (2010)**, who define economy as the practice of obtaining inputs of the required quality at the lowest possible cost. By reducing the "price" of knowledge production in Timor-Leste by more than a quarter within three years, INCT has demonstrated that it does not merely consume budget allocations but manages them with a focus on fiscal efficiency and long-term institutional sustainability.

2. Efficiency Analysis: Operational Productivity and Result-Orientation

Efficiency within the **Value for Money (VfM)** framework evaluates the productivity relationship between inputs (financial resources) and outputs (tangible results). Based on the standards of **Mardiasmo**, efficiency is fundamentally reflected in an organization's capability to maximize results from a limited set of resources.

In the case of INCT, this efficiency is first evidenced by its **High Budget Utilization**, where the institution achieved an average budget absorption rate of **94.15%** for the 2021–2024 period. Notably, in 2023, this absorption reached a peak of **96.93%**, a figure categorized as **"Highly Efficient"** according to established performance standards.

However, high budget absorption alone does not guarantee productivity; it must be matched by a **Productive Transformation** of those funds into physical results. The data reveals that a total research investment of **$233,500** was successfully converted into **139 tangible products**. This comprehensive output consists of:

- **50 Final Research Reports:** Serving as the core scientific evidence and primary technical output.
- **89 Dissemination Activities:** Facilitating the spread of knowledge across Timor-Leste to ensure research accessibility for stakeholders.

This high output-to-input ratio creates a significant synergy with the findings of **Soares et al. (2025)**. While previous studies validated the high administrative budget absorption (96.93%), this analysis expands the scope by explicitly linking financial execution to the production of **139 total outputs**. Consequently, this proves that the high absorption was not merely a matter of administrative spending but represented exceptional operational efficiency.
This shift from spending to production marks a successful transition toward a **Result-Oriented Methodology**, aligning perfectly with the theory of **Pollitt (2004)**. Pollitt argues that **Program-Based Budgeting (PBB)** must transition from rigid, traditional line-item approaches to a model that prioritizes substantive results. By maintaining a **Strategic Outcome Focus**, INCT has successfully prioritized scientific outcomes and dissemination over mere administrative inputs. The successful transformation of a limited budget—especially during periods of fiscal contraction—into 139 scientific products demonstrates that INCT has effectively transitioned toward a modern public management model, providing substantive value to the national science ecosystem of Timor-Leste.

3. Effectiveness Analysis: Substantive Utility and Policy Integration

The final pillar of the VfM framework, **Effectiveness**, measures the extent to which research outputs achieve their intended socioeconomic outcomes. In this study, effectiveness is quantified through a dual-impact lens: the ability to fulfill institutional information needs and the capacity to influence national policy. Based on a comprehensive survey of 72 strategic stakeholders, the results are as follows:

- **Information Impact (61.11%):** 44 respondents confirmed that INCT's research successfully fulfilled their institutional knowledge needs.
- **Policy Impact (58.33%):** 42 respondents confirmed that these research outputs have been actively utilized as a foundational element for government decision-making.

The effectiveness analysis shows a **strong correlation** between these two figures. With **61.11%** of respondents acknowledging the fulfillment of their knowledge needs, INCT has established itself as a **primary provider of evidence-based insights** in Timor-Leste. This achievement aligns with the framework proposed by **Nutley et al. (2007)**, which argues that the effective use of evidence in public services occurs when research actively informs and shapes the practical perspectives of policymakers.

Furthermore, the conversion of this information into actual decision-making by **58.33%** of stakeholders signifies that INCT's research is not merely academic but possesses high **Substantive Utility**. The minimal gap of **2.78%** between information reception and policy application indicates that once stakeholders receive these insights, they are highly likely to integrate them into national governance processes. As argued by **Parkhurst (2017)**, the effectiveness of a state research institution is defined by its ability to ensure the quality and relevance of scientific evidence within a framework of **good governance of evidence**. Consequently, these figures prove that INCT is fulfilling its mandate under the PEDN 2011–2030 by bridging the gap between scientific inquiry and evidence-based governance.

This impact rate serves as tangible evidence of achieving the **Institutional Framework** pillar of the **Timor-Leste Strategic Development Plan (PEDN) 2011–2030**. It confirms that more than half of INCT's research has successfully transformed into a foundation for **Evidence-Based Policy**, fulfilling the national mandate to integrate science into governance. Such a transition aligns with the theory of **Rossi, Lipsey, & Freeman (2004)**, which suggests that program success should be measured by the substantive utility produced for the target population rather than just the volume of publications.

When viewed in **Comparison with Soares et al. (2025)**, these findings provide a more nuanced perspective on institutional success. Unlike previous administrative analyses that focused primarily on fiscal execution, this study confirms that the **$233,500** research investment has delivered significant **Added Value** to the state. Consistent with **Pollitt (2004)**, budget success in the public sector is validated by the utility perceived by the government rather than the mere exhaustion of funds.
While the policy impact rate (58.33%) is numerically lower than the budget absorption rate (96.93%), it remains a remarkably strong indicator of institutional relevance. This gap suggests that while INCT is highly efficient in producing reports, the secondary stage of policy adoption depends on broader external governance factors. Nevertheless, the core objective—providing usable scientific evidence that influences national development—has been clearly achieved, marking a definitive shift from administrative compliance to **substantive national contribution**

The achievement of **58.33%** in the policy impact indicator is a crucial finding, demonstrating that INCT has successfully transitioned into a **primary provider of evidence-based insights**. This high rate of research adoption into national decision-making aligns with the framework proposed by **Nutley et al. (2007)**, which argues that the effective use of evidence in public services occurs when research actively informs and shapes the practical perspectives of policymakers.

Furthermore, this successful policy integration confirms INCT's role in fostering robust knowledge management within the state. As argued by **Parkhurst (2017)** in *The Politics of Evidence*, the effectiveness of a state research institution is not merely measured by the volume of publications, but by its ability to ensure the quality and relevance of scientific evidence within a framework of **good governance of evidence**. Consequently, the **58.33%** impact rate proves that INCT is fulfilling its substantive function in supporting data-driven national policies, even when operating under significant fiscal constraints."

4. Institutional Resilience against Budget Fluctuations

Despite the significant budget fluctuations noted by **Soares et al. (2025)**, where the specific research budget was dramatically reduced by approximately **50%**—from **$83,500** in 2021 to **$41,500** in 2023—**INCT** demonstrated remarkable institutional resilience. This resilience is evidenced by the institution's ability to maintain an effectiveness rate above **50%** amidst such volatile fiscal dynamics, indicating a highly successful prioritization of strategic programs over administrative overhead.

This phenomenon aligns with the perspective of **Abdul Halim (2012)** regarding budget growth and dynamics. Halim suggests that the true measure of institutional capacity is not found in performance during periods of fiscal abundance, but rather in the ability to maintain output quality and organizational accountability during periods of fiscal constraint.

The data confirms that **INCT** did not merely survive these cuts; it optimized its internal processes to ensure that the "Evidence-Based Policy" mandate remained uncompromised. By sustaining a policy impact rate of **58.33%** while operating on a leaner budget, **INCT** has proven that it possesses high institutional capacity. This finding provides a critical counter-narrative to the administrative focus

of **Soares et al. (2025)**, suggesting that **INCT's** success is rooted in its strategic agility and commitment to national development goals rather than simple budgetary execution.

5. **The Correlation Between Negative Growth and Institutional Resilience** The findings indicate a consistent **negative budget growth** between 2021 and 2023, with an average annual contraction of **14.03%**. According to the theory of **Abdul Halim (2012)**, a negative growth trend typically signals a decline in institutional capacity or fiscal support. However, in the case of INCT, this negative growth served as a catalyst for a "Efficiency Drive."

The correlation between the **-14.03% growth rate** and the **96.93% absorption rate** is highly significant. It proves that despite the shrinking "fiscal space," INCT did not experience a "performance paralysis." On the contrary, the institution optimized its internal processes to ensure that the 50 research reports were completed. This demonstrates that INCT has high **Budgetary Adaptability**—the ability to re-align strategic priorities even when the government's financial support is in a phase of contraction.

Table 5.2.1 Summary of Value for Money (VfM) Achievements (2021–2024)

VfM Pillar	Key Indicator	Empirical Result	Performance Category
Economy	Average Cost per Research Project	**$4,670 / Unit**	**Highly Economical**
Efficiency	Budget Absorption Rate (PBB)	**96.93%**	**Highly Efficient**
Effectiveness	Policy Impact / Stakeholder Adoption	**58.33%**	**Highly Effective**
Contextual Factor	Average Budget Growth Rate	**-14.03%**	**Fiscal Contraction**

The results presented in Table 5.1 signify that the **Instituto Nacional de Ciências e Tecnologia (INCT)** has successfully navigated a period of fiscal volatility while maintaining high standards of public accountability. The interpretation of these findings is categorized into four strategic dimensions:

1. **The "Doing More with Less" Phenomenon (Economy)** The reduction in the specific research budget from **$83,500 (2021)** to **$41,500 (2023)** initially posed a severe risk to institutional productivity. However, the empirical data reveals a remarkable adaptation: the average unit cost per research project was optimized to **$4,670**. Within the theoretical framework of **Jones & Pendlebury (2010)**, this exemplifies a "Highly Economical" state, where the institution secured the best possible scientific results at the lowest possible cost. This trend demonstrates a sophisticated level of internal financial control and strategic resource prioritization.
2. **Exceptional Administrative Agility (Efficiency)** The budget absorption rate of **96.93%**, as highlighted by **Soares et al. (2025)**, serves as a benchmark for high administrative efficiency in Timor-Leste's public sector. In public management, high absorption signifies that programs are meticulously planned and executed without significant bureaucratic bottlenecks. The successful conversion of these funds into **139 tangible products** (50 research reports and 89 dissemination activities) reflects a high "input-to-output" ratio, which is the hallmark of an efficient public administration model.
3. **Translating Science into Governance (Effectiveness)** The most vital finding of this study is the **58.33% Policy Impact Rate**. This confirms that more than half of the research produced by INCT was actively utilized by strategic stakeholders to formulate national policy. This aligns with the perspective of **Pollitt (2004)**, who argues that the ultimate validation of a public institution is its ability to provide substantive value that is recognized and utilized by the state. By maintaining stable output levels despite a **50% budget contraction**, INCT has proven that its research is essential to the **Institutional Framework** of the **PEDN 2011–2030**.

4. **Strategic Justification for Fiscal Support (Institutional Resilience)** The synergy between a near-perfect absorption rate and a robust policy impact rate creates an irrefutable, evidence-based argument for future funding. It demonstrates **Institutional Resilience**: the rare ability to maintain performance quality under extreme fiscal pressure. Consistent with **Abdul Halim (2012)**, this capacity is a definitive indicator of high institutional accountability. These findings suggest that INCT is not merely a cost center, but a strategic asset that is highly deserving of increased fiscal support to further the national development agenda.

The synthesis of results in Table 5.1 demonstrates a high level of institutional accountability. Despite the Fiscal Contraction phase (indicated by an average negative growth of -14.03%), INCT achieved a 'Highly Economical' status by optimizing its unit costs. Furthermore, the 96.93% Budget Absorption—which aligns with the findings of Soares et al. (2025)—reflects exceptional administrative efficiency. Most importantly, the 58.33% Policy Impact Rate confirms that INCT's research outputs have moved beyond academic exercise to become a substantive tool for national governance, fulfilling the Institutional Framework mandate of the PEDN 2011–2030."

VI. CONCLUSION AND RECOMMENDATIONS

A. Conclusion

Based on the comprehensive analysis of research budget realization for the 2021–2024 period and impact evaluation from 72 strategic stakeholders, this study concludes that the **National Institute of Science and Technology (INCT)** has successfully implemented **Value for Money (VfM)** principles with an **"Excellent"** performance rating.

1. **Strategic Fiscal Resilience (Budget Growth & Economy):** During the evaluated period, INCT operated under a phase of **Fiscal Contraction**, with an average annual budget growth rate of **-14.03%**. Despite this significant reduction in financial support, the institution proved to be **Highly Economical** by successfully reducing the average unit cost per research project by **27.7%** (from $5,218 in 2021 to $3,772 in 2023). This 27.7% reduction in unit costs was achieved without sacrificing output quantity (remaining at 11 reports in 2023 and 2024). This is the strongest physical evidence yet of "Doing More with Less."
2. **Administrative Excellence (Efficiency):** Operational efficiency demonstrated a consistent upward trend, achieving a peak budget absorption rate of **96.93%** in 2023 (reinforcing the findings of **Soares et al., 2025**). A total research investment of **$233,500** was productively transformed into **139 tangible products**, consisting of **50 final research reports** and **89 dissemination activities**.
3. **Substantive Policy Utility (Effectiveness):** The research reached beyond academic circles, achieving a **58.33% Policy Impact Rate**. This confirms that INCT's work is a vital component of the **Timor-Leste Strategic Development Plan (PEDN) 2011–2030**, effectively serving as a bridge between scientific inquiry and evidence-based governance.

Consequently, these findings suggest that INCT is not merely a cost center, but a strategic asset that provides a high return on investment for the state's intellectual and policy development."

B. Recommendations

Based on the findings of this evaluation, the following strategic actions are recommended:

- **For INCT Management (Strengthening Dissemination):** To bridge the remaining 41.67% effectiveness gap, INCT should adopt a multi-channel dissemination strategy. In addition to establishing a **Digital Knowledge Management System**, strengthening open-access **digital repository** will ensure that policymakers at the ministerial level can access and utilize Relatório Final data in real time, regardless of physical distribution schedules. INCT should also increase direct engagement through **Executive Seminars** and **Policy Talk Shows**. These interactive platforms allow researchers to present "policy key points" directly to decision-makers, fostering direct dialogue and increasing the likelihood of research adoption into national legislation.

- **For the Government of Timor-Leste (Ensuring Fiscal Sustainability):** The Ministry of Finance should recognize the **proven economy and efficiency** of INCT's operations demonstrated during the 2021–2024 contraction period. Given this track record of high accountability, it is recommended that the government transition from a restrictive, contractionary budget toward a **Stable Funding Model** by increasing the "Research Grant" allocation. While the current "doing more with less" approach is commendable as a testament to INCT's short-term resilience, long-term scientific innovation and national competitiveness cannot rely on fiscal uncertainty. To effectively address the complex national challenges outlined in the **PEDN 2011–2030 framework**, INCT requires predictable, multi-year funding that ensures the sustainability of high-impact research for the state.

- **For Future Researchers:** Future studies should employ a **qualitative longitudinal approach** to track the long-term impact of specific research projects on national legislation. Specialized research should also focus on the correlation between **Budget Growth Trends** and **Innovation Output** across other government agencies to validate the institutional resilience model identified in this study.

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