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Efficiency Reformulation of Ministry/Agency Budget Performance

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Abstract:

Budget performance evaluation is an assessment process carried out on budget implementation in order to measure the extent to which the performance of the organization or program funded by the budget has been achieved. Budget performance evaluation aims to evaluate the effectiveness, efficiency, and accountability of budget implementation and assess the extent to which the goals and objectives have been set are achieved. One of the variables used to measure Budget Performance Evaluation (EKA) is the efficiency variable where this variable is obtained from measuring budget allocations, budget realization and achievement of detailed outputs. This article aims to find out whether treatment modifications with various scenarios can maintain efficiency values and to analyze the ideal calculation formulafor efficiency variables. The research method used in this study is a mixed method where the analysis simulates the data in the efficiency formula by changing the numbers in the output indicator realization, output indicator target, budget allocation and budget realization. From the simulation results, it can be concluded that there are inconsistencies in the results obtained from the efficiency figures produced. The implications of the resulting inaccuracies will affect the value of budget performance to be inaccurate and not following the reality in the field. So that it will have a biased impact when giving intensive or budget reductions on the budget performance of ministries/institutions.

Keywords: *Efficiency, Budget, Budget Performance, Evaluation*

1. Introduction

The literature that discusses country economies associated with major budget flows, as discussed by (Bonomi Savignon et al., 2019) starts from the idea that institutional structures have a systematic impact on the behavior and strategic choices of ministers and hence can influence government policy outcomes generated by collective decision processes. Over the past decade, there has been an increasing use of performance-based budgeting at the national level as well as at the subnational and local levels, with a variety of approaches and results in different countries (Brinkerhoff & Wetterberg, 2013). The budget allocated to a Ministry of State /

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Institution by the Ministry of Finance each year is one of the tools to implement the programmed or policy that has been prepared at a Ministry of State / Institution. (Irawan, 2020).

In 2005 the Indonesian government began to implement a budget system at all levels of the Ministry into Performance Based Budgeting (PBK) which is reflectedin Government Regulation Number 90 of 2010, which is derived in the Minister of Finance Regulation number 94 / PMK.02 / 2013 concerning Guidelines for the Preparation and Review of Work Plans and Budgets of Ministries / Institutions (Sinaga, 2016). Therefore, for the implementation of the budget to be optimal and effective, as well as being able to be in line with Government Regulation Number 17 of 2017 concerning Synchronizations of the National Development Planning and Budgeting Process, it is necessary to measure the budget both in terms of performance and performance. the implementation provisions are called the Budget Performance Value (NKA) which consists of the value of the Budget Performance Evaluation (EKA) and the value of the Budget Implementation Performance Indicator (IKPA), the Minister of Finance through regulation number 214 / PMK. 02of 2017 concerning Measurement and Evaluation of Performance in the Implementation of Work Plans and Budgets of Ministries / Institutions which is refined in regulation number 22 / PMK.02 / 2017 and regulation number 195 / PMK.05 / 2018 concerning Supervision and Evaluation of Budget Implementationof Ministries / Institutions and is regulated technically by PER-4 / PB / 2017 concerning Technical Guidelines for Assessing Performance Indicators for Budget Implementation of Ministries / Institutions.

Where in the regulation it is stated that budget performance evaluation (EKA) as one of the performance-based budgeting instruments for the implementation of the accountability function and quality improvement function, the accountability function aims to prove and be professionally accountable to stakeholders for the utilization of the budget managed by the Ministry of State / Institution, echelon 1 unit, and / or related work units and the quality improvement function aims to measure effectiveness and efficiency, as well as identify supporting and inhibiting factors for the implementation of RKA-KL in the context of improving Budget Performance and input for policy making. The results of this performance evaluationserve as a reference for 1) Formulation of themes, targets, policy directions, and priorities for the annual development plan; 2) Preparation of basic number review; 3) Formulation of the following year's budget allocation and/or budget adjustment for the year concerned; 4) Providing or imposing sanctions. As per (Minister of Finance of the Republic of Indonesia, 2021) Budget Performance Evaluation (EKA) in the implementation aspect uses 4 (four) measurement variables, namely output achievement, budget absorption, efficiency, and consistency of budget absorption with planning and for Budget Performance Implementation Indicators (IKPA) has 8 measurement variables, namely: DIPA Revision, DIPA Page III Misappropriation, Expenditure Contract, Bill Settlement, UP and TUP Management, SPM Dispensation, Budget Absorption and Output Achievement.

In line with research Suliantoro (2020) This research will also take efficiency variables as the object of research, with several considerations, namely: 1) There is adiscrepancy between the efficiency formula and the government's steps to takepoliciesto accelerate budget realization, 2) The results of previous research, related to the efficiency formulation, there are inefficiencies in K / L budget performance, one of which is caused by the budget performance efficiency measurement formula which produces biased figures so that it needs to be adjusted, the bias in the efficiency measurement figures has implications for inaccurate budget performance values, and
3) The quantity of research on efficiency variables is still small, resultingin the current formula being believed to be the most appropriate formula.

The first to formulate efficiency measurement was Farrel (1957) in (Mujaddad & Ahmad, 2016) who explained about the existence of a simple measurement technique of an efficiency unit to measure the level of efficiency of an employee in working for a company. At that time, efficiency was divided into two things, namelytechnical efficiency and allocative efficiency (Samarpitha et al., 2016). Where the meaning of technical efficiency is the measurement value of a person's ability inunits to provide maximum results on the output produced with certain inputs (Subagyo, 2022). While allocative efficiency provides a form of measurement of a unit in managing resources or budgets as inputs that are managed optimally and produce quality outputs (Priyadi et al., 2021).

In accordance with research Biswan & Grafitanti (2021) the efficiency formula is carried out by comparing the difference between expected expenditure and budget realization with budget allocation, expected expenditure is the amount of budget needed to produce the level of achievement of program outputs or RO achievements that have been achieved based on the allocation plan per target (Fuior & Gutan, 2015), and budget realizations is the amount of budget realized to produce program output achievements or RO achievements (Kostiukevych et al., 2020), the dataneeded to measure program output efficiency and RO efficiency include: program output achievement, RO achievement, ceiling in the last DIPA, and budget realizations, if the achievement of budget realizations is greater than the achievement of the output which is -20, and vice versa, and the value of efficiency contributes to the value of EKA by 28.6%, meaning that if the value is -20 it willlose the value of EKA by 28.6%. By looking at how the efficiency component is calculated, a Satker (Satuan Kerja) with 100% budget realizations achievement, 100% output achievement, can lose 28.6% value, in other words, the EKA value willdecrease, and of course NKA will also decrease.
This research is policy analysis research in the public sector, where relevant previous research references are minimal, but the researcher Suliantoro (2020) used the variables of budget absorption, output achievement, efficiency and consistencyof budget absorption with the simulation method on the formulation while (Irawan, 2020) used the variables of budget absorption, output achievement, efficiency and consistency of budget absorption. (Irawan, 2020) using the DEA test tool, budget

absorption, consistency of budget absorption with planning, achievement of activity outputs, efficiency, performance value of work units with different test techniques using the Wilcoxon Signed Rank Test (Putra, 2021). Public sector budgeting with an exploratory approach with observations, interviews and theoretical review (Biswan and Grafitanti, 2021). Evaluation of the Performance Measurement System using descriptive qualitative methods with a case study approach (Khaeruddin & Aditiya, 2020)

There is also research using literature review techniques written by (Meily Surianti and Abdul Rahman Dalimunthe, 2017), while research (Bonomi Savignon et al., 2019) analyses the dynamics of strategic planning and performance management practices in relation to the budgeting process in the context of the Italian central government. There is also research that investigates whether operational managers' participation in budgeting can provide appropriate value to budget-based evaluations in order toreward their employees (Wagner et al., 2021).

To complement the above research considerations, this study takes the case of the Ministry of Education, Culture, Research and Technology, with the reason that the selection of the education function budget in 2022 is 20% of the state budget, which is Rp542. 83 trillion. Although the achievement of the Budget Performance Value (NKA) for the last four years is included in the very good category, when viewed in terms of efficiency with the measurement formula set by the Minister of Finance, the efficiency value mostly produces inefficient values (<+20). The purpose of this study is to determine whether treatment modifications with various scenarios can maintain efficiency values and analyze the ideal calculation formula for efficiency variables.

2. Theoretical Background

Value of Budget Performance (NKA)

Until now, performance-based budgeting is still something that is often used in measuring success during budget planning (Surianti & Dalimunthe, 2015). This is in accordance with the opinion of Mohammadipour contained in Biswan & Grafitanti (2021) which states that "Performance based budgeting is one of the most important parts of the budgeting system and plays essential roles for the success of any organization". Coupled with the existence of law number 17 of 2003 concerningstate finances which requires performance-based budgeting.

Since 2014, the Ministry of Finance (MoF) has established Key Performance Indicators (KPIs) as a tool to measure the level of success in budget implementation at the internal level. The calculation element consists of budget absorption and output achievement. According to an article on the Ministry of Finance (https://www.djkn.kemenkeu.go.id/) written by Edy (2020; 1) he said that "This performance indicator is a tool used in government agencies to measure the success

of an object. In order to measure the level of success in the implementation of the budget in the internal scope, the Ministry of Finance has established a Key Performance Indicator as a basis for measuring Budget Absorption and Achievement of Government Expenditure Output."

In accordance with circular SE-8 / MK.1 / 2020, there are several calculations of IKU PKPA achievements, namely the Main Performance Indicator Achievement of the Percentage of Budget Implementation Performance for the first quarter to the third quarter can be seen in the IKPA achievement. Therefore, the achievement of IKU PKPA for the first to third quarters is the same as the IKPA value displayed on the OM SPAN screen according to the required period. Meanwhile, annual achievements can be calculated from the achievement of the Budget Performance Evaluation (EKA) through the SMART application and the IKPA value according tothe weight of each unit from the calculation of the quality elements of the Central Government Budget in the Main Performance Indicators (KPI) and Harmonization of the Central Budget and the budget in the regions of the Ministry of Finance(where it has been determined in the SE in 2020), namely SMART by 60 percentand IKPA by 40 percent, so that the overall total is 100 percent.

Table 1. Budget Performance Score Weighting

Budget Performance Value			
Evaluation of Budget Performance 60%		Budget Implementation Performance Indicators 40%	
1. Output Achievement	43,5%	1. Revision DIPA	10%
2. Budget Absorption	9,7%	2. Deviation Hal III DIPA	10%
3. Efficiency	28,6%	3. Contractual Expenditure	10%
4. Consistency of Budget Absorption with Planning	18,2%	4. Bill Settlement	10%
		5. Management of UP and TUP	10%
		6. SPM Dispensation	5%
		7. Budget Absorption	20%
		8. Output Achievement	25%

Source: Minister of Finance Regulation number 22/PMK.02/2021

Therefore, in order to get a satisfactory score for the KPI PKPA of 95.5 percent, it is very necessary to have several strategies for good and efficient planning, implementation and results of budget implementation from several Ministries / Institutions, all echelon I units and also the work unit level. To make it all happen there must be good teamwork and a qualified understanding to achieve an optimal level of

budget expenditure to encourage economic growth in Indonesia.

Budget Implementation Performance Indicators (IKPA)

In 2021, IKPA has 13 indicators divided into 4 aspects: aspects of planning conformity with budget implementation, aspects of compliance with budget implementation regulations, aspects of budget implementation efficiency, and aspects of budget implementation effectiveness. The results of IKPA 2021 have effectively increased the attention of Ministries / Institutions to budget implementation governance as evidenced by the increasing level of compliance of Ministries / Institutions with budget use regulations, and improved performance of 13 indicators in IKPA as stipulated in the Director General of Treasury Number PER-4 / PB / 2021 concerning Technical Guidelines for Assessing Performance Indicators for Budget Implementation of State Ministries / Institutions.

However, in 2022, the Ministry of Finance conducted another evaluation of the IKPA achievements which subsequently made changes to the budget implementation performance assessment which previously focused on improving budget implementation governance to focus on improving the quality of spending supported by accelerated spending and output achievements. The aim is that ministries / institutions are able to contribute optimally in generating economic spending and public welfare. This change is contained in the form of IKPA Reformulation 2022.

Budget Performance Evaluation (EKA)

Following Minister of Finance Regulation number 22/PMK.02/2021 (Menteri Keuangan RI, 2021) concerning Measurement and Evaluation of Budget Performance on the Implementation of Work Plans and Budgets of Ministries/Institutions, budget performance evaluation is divided into two types: Non-Regular Budget Performance Evaluation and Regular Budget Performance Evaluation. Non-Regular Budget Performance Evaluation is a Budget Performance Evaluation conducted by the Minister of Finance in accordance with the needs and policies for specific purposes. The Minister of Finance conducts Non-Regular Budget Performance Evaluations for the current fiscal year and/or the previous fiscalyear. This evaluation is carried out to produce information as a consideration for policy formulation, especially policies in the field of budgeting (Höchtl et al., 2016). Data and results from Regular Budget Performance Evaluations can be used to support the implementation of Non-Regular Budget Performance Evaluations (Park et al., 2018).

Regular Budget Performance Evaluations are Budget Performance Evaluations carried out by the Minister of Finance and/or the Minister/Leader of anInstitution/Leader of an Echelon I unit/Leader of a work unit on a regular basis. Regular Budget Performance Evaluation is carried out periodically at least twice a year, once for the current fiscal year and once for the previous fiscal year (Drury, 2013). Evaluation for Regular Budget Performance is divided into three aspects:

Budget Performance Evaluation on Implementation Aspects, Budget Performance Evaluation on Benefits Aspects and Budget Performance Evaluation on Context Aspects (Vilanova et al., 2015). From the three types of regular budget performance evaluation, the type of budget performance evaluation on the implementation aspect is the type of budget that provides information about the efficient use of the budget (Melkers & Willoughby, 2005).

Budget Performance Evaluation (EKA) on Implementation Aspects

In a journal written by Putra (2021) this type of budget performance evaluation of the implementation aspect is carried out to produce performance information regarding the use of the budget in the context of implementing activities or programs and achieving their outputs. To determine the size of the budget performance in the implementation aspect, 4 (four) measurement variables are used, namely output achievement, budget absorption, efficiency, and consistency of budget absorption with planning (Adhi & Aima, 2021).

While at the stage of measuring budget performance, some of the data measured in each formula are shown in the table below:

Table 2. Data measured for each variable

No	Variable	Measured data
1	Accomplishments Output Program	- Output realization indicator (RIO) - Output target indicator (TIO)
2	Budget Absorption	- Budget Realization (RA) - Budget Allocation (AA)
3	Efficiency	- Budget Realization (RA) - Budget Allocation (AA) - Program Output Achievement (COP)
4	Consistency of Budget Absorption with Planning	- Budget Realization (RA) - Fund Withdrawal Plan (RPD)

Source: data processed, 2023.

From the table above, we can then describe the measurements in each formulation according to the variables, namely (PMK, 2021):

1. Program Output Achievement Formula (COP). This output achievement includes the division between the realization of the program output indicatorand the target of the program output indicator. This program output achievement measures budget performance evaluation at the echelon I/Program unit level. Theequation formula is:

$$COP = \left(\prod_{i=1}^{l} \left(\prod_{j=1}^{m} \left(\prod_{k=1}^{n} \frac{RIOP_j}{TIOP_j} \right)^{\frac{1}{n}} \right)^{\frac{1}{m}} \right)^{t} \quad (1)$$

2. Budget Absorption Formula. This budget absorption is calculated by comparing the budget realization with the budget allocation multiplied by one hundred percent. The equation formula is :

$$P = \frac{RA}{AA} x100\% \quad (2)$$

3. Efficiency Formula. This efficiency variable is used to measure the efficiency of budget performance by multiplying the budget allocation by the achievement of program outputs which are reduced by the budget realization and divided by the budget allocation. The equation value can be written as follows:

$$E_{OP} = \frac{\sum_{i=1}^{n}((AA\ Program_i \times COP_i) - RA\ Program_i)}{\sum_{i=1}^{n}(AA\ Program_i)} \times 100\% \quad (3)$$

$$NE = 50\% + \left(\frac{E}{20} x50\right) \quad (4)$$

4. Budget Absorption Consistency Formula against Planning. This measurement is carried out by measuring the average of the comparison between the results of reducing the accumulated withdrawal plan and the deviation of budget realization and cumulative withdrawal plan. The equation formulation can be written as follows:

$$K = \frac{\sum_{i=1}^{n}\left(\frac{RPDK_n - |RPDK_n - RAK_n|}{RPDK_n} \times 100\%\right)}{n} \quad (5)$$

3. Methodology

The method used in this research is a mixed method where the research uses a qualitative approach by simulating existing data on budget performance formulas using a quantitative approach (McCusker & Gunaydin, 2015). The object of this research is the efficiency formula contained in the Budget Performance Evaluation on the Implementation aspect. The type of data used is quantitative data taken from simulation results with various scenarios followed by assumptions that are close to the situation in the field (Rahi, 2017). As for data sources, researchers take data sources from secondary data contained in the Minister of Finance Regulation no 22 / PMK.02 / 2021 which contains measurements and evaluation of budget performanceon the implementation of work and budgets of state ministries / institutions as wellas other related research articles or journals.

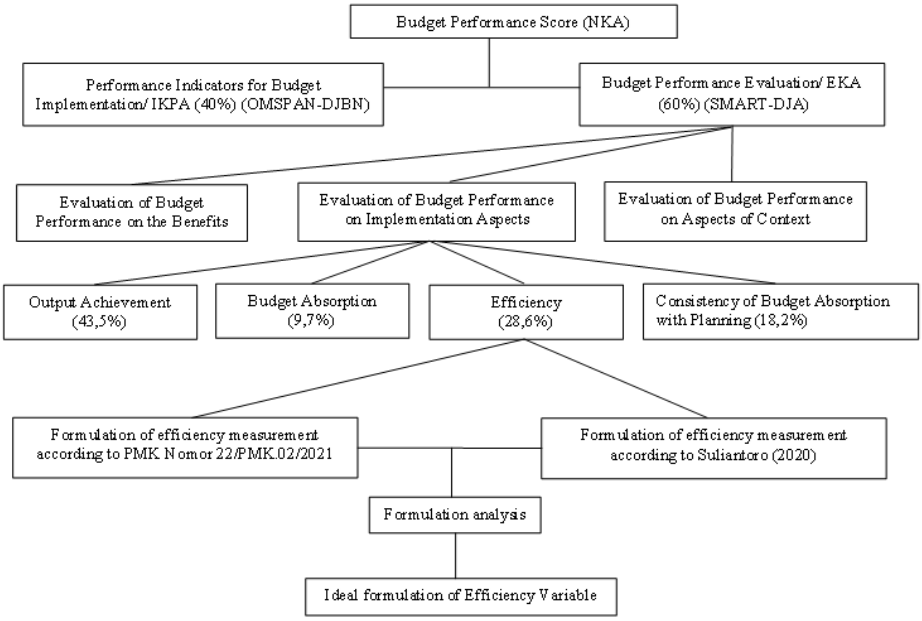

Figure 1. Theoretical Thinking Framework
Source: Data processed, 2023.

4. Empirical Findings/Result

For the calculation of the achievement of the annual Budget Performance Value (NKA) following the regulations of the Minister of Finance, it has been determined that it must be calculated manually using EKA (60%) and IKPA (40%) achievement data. Budget Performance Evaluation and Implementation Performance Indicators each have indicators used to measure the quality of budget performance. So that information about the indicators in IKPA and EKA and their percentage and weight as well as their influence on the achievement of the annual Budget Performance Value (NKA) can be displayed in the following table:

Table 3. Achievement of Budget Performance Value (NKA)

No	Assessment Indicator	Indicator Weight	Weight to NKA	Effect of indicators on NKA
Budget Implementation Performance Indicators (IKPA)				
1	Revision DIPA	10%		4%
2	Deviation Hal III DIPA	10%		4%
3	Contractual Expenditure	10%		4%
4	Bill Settlement	10%		4%
5	Management of UP and TUP	10%		4%
			40%	

No	Assessment Indicator	Indicator Weight	Weight to NKA	Effect of indicators on NKA
6	Dispensation SPM	5%		2%
7	Budget Absorption	20%		8%
8	Output Achievement	25%		10%
Budget Performance Evaluation (EKA)				
1	Output Achievement	43,5%		26,10%
2	Budget Absorption	9,7%		17,16%
3	Efficiency	28,6%	60%	10,92%
4	Consistency of Budget Absorption with Planning	18,2%		5,82%

Source: Data processed (2023)

The budget performance measurement formula is divided into two terms, namely efficiency number E and efficiency value (NE). The number in NE is a conversion of the Efficiency value where -20% to +20% is converted to 0% to 100% with the Efficiency Value formula. The NE shows that if the E value is equal to -20%, the NE number becomes 0%, indicating that the target number is too difficult to achieve or the budget allocation number is too small. However, if the E value is equal to 20%, then the NE value will be 100%, which shows that if the E value can reach more than 20, it is assumed that the target is too easy to achieve or the value of the budget allocation figure is too large.

And if the E value is at 0%, the NE value will show a value of 50%, which shows that the output achievements and budget realization are in accordance with the targetand budget allocation. In order to measure the Efficiency (E) formula, it will require four related variables, namely Budget Allocation (AA), Budget Realization (RA), Target Output Indicator (TIO), and Realization of Output Indicator (RIO).

Simulation 1

In this simulation 1, it will be assumed that all conditions are at the 100% level, which means:

1. All activities are in accordance with the plan,
2. All elements in the implementation of the budget are in accordance with established regulations,
3. All activities are carried out effectively and efficiently,
4. All output volume targets and output performance indicators were achieved 100%,
5. Budget realization is achieved 100% without any remainder.

Table 4. Simulation 1

No	Assessment Indicator	Indicator Weight	Value of each indicator	Effect on NKA	NKA Achievement
Budget Implementation Performance Indicators (IKPA)					
1	Revision DIPA	10%	100%	4%	4%
2	Deviation Hal III DIPA	10%	100%	4%	4%
3	Contractual Expenditure	10%	100%	4%	4%
4	Bill Settlement	10%	100%	4%	4%
5	Management of UP and TUP	10%	100%	4%	4%
6	Dispensation SPM	5%	100%	2%	2%
7	Budget Absorption	20%	100%	8%	8%
8	Output Achievement	25%	100%	10%	10%
Total		100%		40%	40%
Budget Performance Evaluation (EKA)					
1	Output Achievement	43,5%	100%	26,10%	26,10%
2	Budget Absorption	9,7%	100%	10,92%	10,92%
3	Efficiency	28,6%	50%	17,16%	8,58%
4	Consistency of Budget Absorption with Planning	18,2%	100%	5,82%	5,82%
Total		100%		60%	51,42%

Source: Data processed (2023)

With all these assumptions, the value of IKPA will be 40% while the value of EKA will be 51.42%, so that the total NKA will be 91.42%. The EKA value shown cannot reach the maximum value of 60%, this is due to the influence of the efficiency value that is not maximized even though all indicators are at the highest value. Simulation 1 illustrates the current condition of the work unit where budget realization is at 100% and all output volumes and output performance indicators also reach 100%, which means that all targets and realizations are achieved using all available budget

allocations. Thus, there is no remaining budget or achievement of outputs and output indicators that exceed the target so that it can be seen that efficiency will be zero. In simulation 1, assuming the condition of the work unit as described above, the achievement of the annual Budget Performance Value (NKA) has not reached 100% or is still at 91.42% and has not reached the minimum target of 95%.

From this explanation, it can be said that the Efficiency formulation has not yet given the real value even though the simulation assumptions written down have given the maximum value.

Simulation 2

By continuing the value of simulation 1, the next simulation was carried out on the efficiency variable by changing the numbers on the related variables, namely program output achievement (COP), budget realization (RA) and budget allocation (AA). In order to facilitate the calculation, the change in numbers is done by increasing the variable by 20% and decreasing the variable number by -20%. This 20% figure indicates a higher realization figure of 120% of the target and this -20% figure indicates a lower realization figure of 80% of the target.

Seeing that formula 1 is part of formula 3, this simulation will be applied to both formulations.

Table 5. Simulation of Measurement of Program Output Outcomes (COP)

No	Scenario	Indicator Name	Volume indicator output Target	Realization	Program Output Outcomes (COP)
1	Scenario 1	Indicator A	4	4	1
		Indicator B	5	5	1
2	Scenario 2	Indicator A	4	4,8	1,2
		Indicator B	5	6	1,2
3	Scenario 3	Indicator A	4	3,2	0,8
		Indicator B	5	4	0,8

Source: Data processed (2023)

Table 5. illustrates a simulation of the measurement of program output achievements (COP) whose calculations are derived from formula 1.

The assumptions used in the table include:

1. A work unit has two program output indicators, namely indicator A and indicator B,
2. The target of output indicator A is 4 units,
3. The target of output indicator B is 5 units,
4. In field conditions, the volume of realization of program output indicators will not exceed the target of program indicators. However, for the sake of simulation

activities, it is assumed that the realization of output indicators will increase to 120% by revising the budget.

Scenario description:

1. Scenario 1: The realization of the output indicator is equal to the target output indicator so that the result of the program output achievement is equal to 1 or 100%.
2. Scenario 2: The realization of output indicators 1 and 2 increases by 20% from the target output indicators so that the result of program output achievement is 1.2 or 120%.
3. Scenario 3: The realization of output indicators 1 and 2 decreased by 20% from the target output indicators so that the results of the program output achievement decreased to 0.8 or 80%.

From the simulation results of the three scenarios above, it can be concluded that with an increase or decrease in program output indicators, the value is directly proportional or equal to the increase or decrease in program output achievement. With an increase in program output indicators by 20%, it will increase the value of program output achievements by 20% as well, and vice versa.
After knowing the value of COP which reflects the effect of an increase or decrease in program output indicators, then the COP value will be related to the Efficiency (E) figure.

Table 6. Simulation of Efficiency measurement

No	Scenario	Output Name	Achievement of program outputs (COP)	Budget allocation (AA)	Budget realization (RA)	Efficiency (E)
1	Scenario 1	Output AB	1 (100%)	100	100	0%
2	Scenario 2	Output AB	1 (100%)	100	80	20%
3	Scenario 3	Output AB	1(100%)	100	120	-20%
4	Scenario 4	Output AB	1,2(120%)	100	100	20%
5	Scenario 5	Output AB	0,8 (80%)	100	100	-20%
6	Scenario 6	Output AB	1,2 (120%)	100	120	0%
7	Scenario 7	Output AB	1,2 (120%)	100	80	40%
8	Scenario 8	Output AB	0,8 (80%)	100	120	-40%
9	Scenario 9	Output AB	0,8 (80%)	100	80	0%

Source: Data processed (2023)

The table above describes the measurement of efficiency where the COP value comes from table 5 and the calculation of efficiency results comes from formula 3.
The assumptions used in table 6 above are:

1. A work unit has only one output, for example: output AB.
2. The budget allocation (AA) for output AB is Rp 100.

3. In practice in the field, the RA figure cannot exceed AA, but for the sake of research, RA is assumed to increase by 20% through budget revision. So for one reason or another the COP has a fixed figure but 20% more budget is requiredso RA rises 20% higher than AA. Then AA is revised in such a way that AA is initially increased by 20% resulting in AA finally becoming equal to RA. Thus the 20% increase in RA is temporary because of the budget revision (which in the end AA = RA).

The scenarios that occur in table 6 are:

1. Scenario 1: COP = 1 with AA = 100 and RA = 100. Result E = 0%,
2. Scenario 2: COP = 1 with AA = 100 and RA = 80. Result E = 20%,
3. Scenario 3: COP = 1 with AA = 100 and RA = 120. Result E = -20%,
4. Scenario 4: COP = 1.2 with AA = 100 and RA = 100. Result E = 20%,
5. Scenario 5: COP = 0.8 with AA = 100 and RA = 100. Result E = -20%,
6. Scenario 6: COP = 1.2 with AA = 100 and RA = 120. Result E = 0%,
7. Scenario 7: COP = 1.2 with AA = 100 and RA = 80. Result E = 40%,
8. Scenario 8: COP = 0.8 with AA = 100 and RA = 120. Result E = -40%,
9. Scenario 9: COP = 0.8 with AA = 100 and RA = 80. Result E = 0%.

From the simulation results with the 9 scenarios above, we can see some of the problems that arise in the results of the efficiency value :

1. At COP = 1 the magnitude of the difference between RA and AA has a value inversely proportional to the magnitude of the efficiency number (E) but with the same value. Where a 20% decrease in RA against AA will increase the number E by 20%. Vice versa.
2. At the number where AA = RA, the magnitude of the change in COP is directly proportional to the magnitude of the efficiency value. Where when the COP rises 20%, the value of E is equal to 20% and if the COP drops 20%, the value of E is -20%. show is 0%.
3. However, when the condition where COP = 1 where the output achievement is 100%, RA = AA so that there are no funds left and the target is achieved 100%. The E result shown is 0%.
4. If in the condition where the COP value increases by 20% but the AA value is the same and the RA value also increases by 20%, the value of E will be equalto 0% (the value is the same if the conditions are all achieved 100%). But if the RA value drops by 20% where the COP rises by 20% the result of the value ofE is equal to 40% (the increase is 2x).
5. If the COP condition drops by 20% but the AA value is the same and the RA value increases by 20%, the value of E will be -40% (2x decrease). However, if the RA value drops by 20% where the COP drops by 20%, the resulting E value is 0%.

Henceforth, after knowing the Efficiency value, the number will be converted into units of 0 - 100% with formula 4.

Table 7. Simulated measurement of Efficiency Value

No	Scenario	Output Name	Efficiency (E)	Efficiency Value (NE)
1	Scenario 1	Output AB	0%	50%
2	Scenario 2	Output AB	20%	100%
3	Scenario 3	Output AB	-20%	0%
4	Scenario 4	Output AB	20%	100%
5	Scenario 5	Output AB	-20%	0%
6	Scenario 6	Output AB	0%	50%
7	Scenario 7	Output AB	40%	150%
8	Scenario 8	Output AB	-40%	-50%
9	Scenario 9	Output AB	0%	50%

Source: Data processed (2023)

From the table shown above, it can be seen that the Efficiency numbers after being converted to 0% - 100%, as follows:

1. If the value of E = 0% then after conversion NE becomes 50%,
2. If the value of E = 20% then NE = 100%
3. If the value of E = -20% then NE = 0%
4. If the value of E = 40% then NE = 150%
5. Whereas if the value of E = -40% then NE = -50%

From the simulation results in table 4 to table 7 above, it can be concluded:

1. Inconsistency between the results of the efficiency figures (E) generated and the conditions in the field, this can be seen from the efficiency value if the program output and budget realization are achieved (100%) then the efficiency results if we used that formula are only worth 0% which if converted on a rating scale (NE) becomes 50%
2. There is no difference between the budget allocation and budget realization (RA = AA), the performance shown by the efficiency value should also be 100%, but in the calculation formula above the Efficiency figure shows a value of 50% (when E = 0% then NE = 50%). Similarly, when the achievement of program outputs exceeds the target of 20% and there is a budget realization that exceeds the budget allocation, the efficiency value shows 50%. This value is the same when performance is at its maximum and well achieved.

From these conclusions, it shows that formula 4 and formula 5 cannot show efficiency figures accurately and cannot describe conditions in the field or in this case become biased. This is in line with research Suliantoro (2020) which also shows the inconsistency of the previous formula.

Therefore, it is necessary to modify the formulas. The modifications suggested by the researcher are as follows:

$$E = \sum_{i=1}^{n} COP \times \frac{RA}{AA} \times 100\ \% \qquad (6)$$

Table 8. Simulation of efficiency measurement by changing the formula

No	Scenario	Output Name	Program output achievement (COP)	Budget Allocation (AA)	Budget Realization (RA)	Efficiency (E) Formula 3	Efficiency Value (NE) Formula 4	Efficiency(E) Formula 6
1	Scenario 1	Output AB	1 (100%)	100	100	0%	50%	100%
2	Scenario 2	Output AB	1 (100%)	100	80	20%	100%	80%
3	Scenario 3	Output AB	1(100%)	100	120	-20%	0%	120%
4	Scenario 4	Output AB	1,2(120%)	100	100	20%	100%	120%
5	Scenario 5	Output AB	0,8 (80%)	100	100	-20%	0%	80%
6	Scenario 6	Output AB	1,2 (120%)	100	120	0%	50%	144%
7	Scenario 7	Output AB	1,2 (120%)	100	80	40%	150%	96%
8	Scenario 8	Output AB	0,8 (80%)	100	120	-40%	-50%	96%
9	Scenario 9	Output AB	0,8 (80%)	100	80	0%	50%	64%

Source : data diolah, 2023

From the calculation scenario with formula 6 above, it can be concluded that:

1. When the value of program output achievement is 1 (100%) where all program outputs are maximally completed while there is no remaining budget (RA=AA) then the Efficiency value reaches 100%. This can prove well that with the condition that all programs are in accordance with planning, all output indicators are achieved 100% and there are no remaining funds where all budgets are absorbed perfectly, the efficiency value is also 100% where the performance of a performance can be said to be very efficient and effective.
2. However, if the output achievement drops by 20% (COP=80%) with AA=RA then the Efficiency value is equal to 80%. Likewise, if the value of COP = 1 with the value of budget realization decreases by 20% (RA = 80) then the efficiency value becomes 80%. This can explain that if there is a decrease inone of the variables of output achievement and budget realization, the efficiency value will also decrease by the value of the decrease.

If the output achievement increases by 20% (COP=120%) with AA=RA then the efficiency value will increase to 120% and vice versa. So it can be said that if there is an increase in the variable output achievement and budget realization by 20% then the efficiency value will also increase by the same value.

5. Discussion

From the results of this study, by using formula three it can be said that there is an inconsistency in terms of the value generated with field conditions, which can ultimately lead to biased results from efficiency calculations so that it can affect the results of the Budget Performance Evaluation value so that it cannot be used as a

benchmark in giving consideration in assessing work results and incentives forbudget performance.

However, if you use the new formulation, namely formulation six, then by using the results from the simulation calculations it can be seen that there is a consistent value effect on the results of the efficiency formulation. Which results from the calculation of the efficiency value can reflect or at least approach the conditions in the field so that the Budget Performance Evaluation value can consistently provide a real assessment and is expected to be used in giving consideration in giving incentives to Ministries/Agencies.

In line with Suliantoro (2020) research where the researcher also found inconsistencies in the previous formula, so that his research also provided a new alternative formula as a solution to the previous formulation.

With new formula it is possible to show performance without the need to convert to a scale of 0 – 100% so formula 4 is no longer needed, because the results of calculations in formula 6 can already provide a value with that scale. Ministries/agencies that have performed optimally should receive incentives for their budget performance. This incentive is an additional budget allocation that will be given to all ministries/agencies for performance achievements in the previous fiscal year. Incentives are given to Ministries/Institutions based on the results of an assessment of the budget performance that has the best budget performance value. The evaluation of budget performance is carried out by the DJA by considering the results of the budget performance evaluation score (EKA) and budget performance score (NKA) with a weight of 60%:40%.

Based on NKA, one of them is influenced by the efficiency value, so if the efficiency is not accurate it will cause inaccuracies in the formulation. So that in general it will affect the performance of ministries/agencies in the field because the NKA value will also not match the reality. If this NKA relates to the provision of incentives and/or sanctions, then the impact will be a bias in the provision ofincentives/sanctions on ministries/agencies budget performance. In other words, giving incentives to ministries/agencies cannot be based on accurate efficiency calculations

6. Conclusions

From the overall discussion in the previous chapter, it can be concluded that in formula 4 there are inaccuracies in the results of the Efficiency Value (NE) wherethe calculation results cannot be interpreted with practical conditions in the field.The inaccuracy can be seen from the efficiency value compared to the value ofoutput achievement and budget allocation, where :

1. Efficiency on the side of budget achievement (RA=AA) with output achievement (COP=1) only produces an efficiency value of 50%. In other

words, although all program output achievements are in accordance with regulations and initial planning and budget realization is achieved 100% without any remaining, but the efficiency cannot reach the maximum figure of 100% can only reach 50%.

2. Efficiency in terms of output achievements increased by 20% and budget realization also increased by 20%, so the resulting efficiency value was also 50%. It can be said that whether the output achievement has increased and the budget realization has over budget, the efficiency value will still be seen to havea value of 50%, the same as point 1.
3. From the two points described above, it can be concluded that formulas 3 and 4 cannot provide accurate efficiency figures and cannot accurately interpret conditions in the field.

In this regard, the author recommends that the Directorate General of Budget reconsider the previous formula for measuring Budget Performance Efficiency:

$$E_{OP} = \frac{\sum_{i=1}^{n}\left((\text{AA Program}_i \times \text{COP}_i) - \text{RA Program}_i\right)}{\sum_{i=1}^{n}(\text{AA Program}_i)} \times 100\% \quad (7)$$

Menjadi formula sebagai berikut :

$$\text{E} = \sum_{i=1}^{n} COP \times \frac{RA}{AA} \times 100\ \% \quad (8)$$

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