INTEGRITAS
JURNAL ANTIKORUPSI

Examining the efforts of government Internal Supervisory Apparatus (APIP) in enhancing bureaucratic reform, organizational integrity, and risk management: An efficiency analysis

Kurniawan Permana [a] *, Chindy Chresna Agung Bujana [b]

Inspektorat Jenderal Kementerian Keuangan. Jl. Dr. Wahidin Nomor 1, Jakarta, 10710, Indonesia
[a] kurniawan.permana@kemenkeu.go.id; [b] chindybujana@kemenkeu.go.id
*Corresponding Author

Abstract: The efficiency level of APIPs should be a concern for the government to ensure that the resources allocated are optimally used to fulfill its role in preventing and detecting corruption. This study investigates the efficiency level of APIP using Data Envelopment Analysis (DEA). The number of employees and spending budget ratios of APIP are used as input, and ministries and regional government's bureaucratic reform, risk management, and integrity perception score as output. Those outputs are selected since they represent the indicators of an effective anti-corruption effort. Applying a purposive sampling of 50 APIPs at the ministerial and regional levels, this study shows that only seven APIPs (14%) achieve maximum efficiency level. Furthermore, this study develops an algorithm to set those APIPs as a reference group by other similar APIPs based on the characteristics of inputs and output. Lastly, this study employs quadrant analysis to map the APIP's efficiency level and its capabilities. It finds that 14 APIPs are relatively efficient and capable, while 35 APIPs are capable but not relatively efficient, and one APIP is not capable or efficient. This study could be used to design a more detailed and tailor-made agenda for strengthening APIP as an essential element in combating corruption in Indonesia.

Keywords: Efficiency Analysis; APIP; Government Internal Supervisory Apparatus; Indonesia; DEA

Introduction

The need for a more accountable, transparent, and efficient state finance has been the spirit that underlies the reform in Indonesia. The reform itself encompasses political reform through the implementation of decentralized government over centralized government and the bureaucratic reform that aspires to achieve good governance and clean government (Turner et al., 2022). Those reforms were followed by the state finance reform, which encompasses all phases of financial management, from the planning, budgeting, implementation, controlling, supervision, auditing, and reporting phases (Government of Indonesia, 2003). One of the fundamental agendas in the state finance reform that contributed to the achievement of good governance and clean government was the establishment of a government internal control system (SPIP).

The SPIP underlines the role of the Government Internal Supervisory Apparatus (APIP) in implementing internal audit functions for all ministries, agencies, and regional governments. Indeed, many studies emphasize the role of auditing and oversight in combating corruption as well as the role of auditors to protect the public interest (Paterson et al., 2019; van Brenk et al., 2022). In a more specific context, the empowerment of the government's internal audit function by public managers is needed as the urge for accountability and transparency increases (Diamond, 2002). In this case, the function of APIP to monitor the internal control system could provide an early warning system to prevent and detect irregularities and misuse (Jeppesen, 2019) and decrease information asymmetry between government and citizens (Hay & Cordery, 2018). This argument is also echoed by the Association of Certified Fraud Examiners (2022), which highlights that internal auditors are able to detect corruption more frequently than external auditors. Saptono &

Purwanto (2022) also found that the lack of quality and capability of the internal audit is still an obstacle in the policy of eradicating corruption, especially in state-owned enterprises. Thus, it can be said that the role of APIP, which provides supervisory and oversight toward the government, became an important element of the anti-corruption agenda in Indonesia.

The critical role of APIP in combating corruption is acknowledged by the government. Strengthening the capacity of APIP became one objective of the National Anti-Corruption Strategy in 2018. Ministry of State Apparatus Utilization and Bureaucratic Reform (Kemenpan-RB) also points out the role of APIP as one component of building an Integrity Zone toward a Corruption Free Area and Clean Serving Bureaucratic (ZI-WBK/WBBM) (Kemenpan-RB, 2021). In order to measure the effectiveness of the implementation of the APIP role, the Financial and Development Supervisory Board (BPKP) has conducted a measurement of the APIP capability level as an indicator of how far APIP has contributed to the achievement of organizational goals. The BPKP Regulation Number 6 of 2015 on the Grand Design for Increasing APIP Capability in 2015-2019 states that the capability level of 85.23% of APIP in 2015 was still at level 1 on a scale of 5 (BPKP, 2015). This indicates that there is a risk that APIP has not been able to carry out its role and provide added value for the organization optimally. Fortunately, this condition has experienced a significant improvement in 2022. According to BPKP (2022), 54.74% of APIP have reached a capability level above 3, 38.2% of APIP are at level 2, and 7.06% of APIP are still at level 1. The comparison of these conditions can be seen in Figure 1.
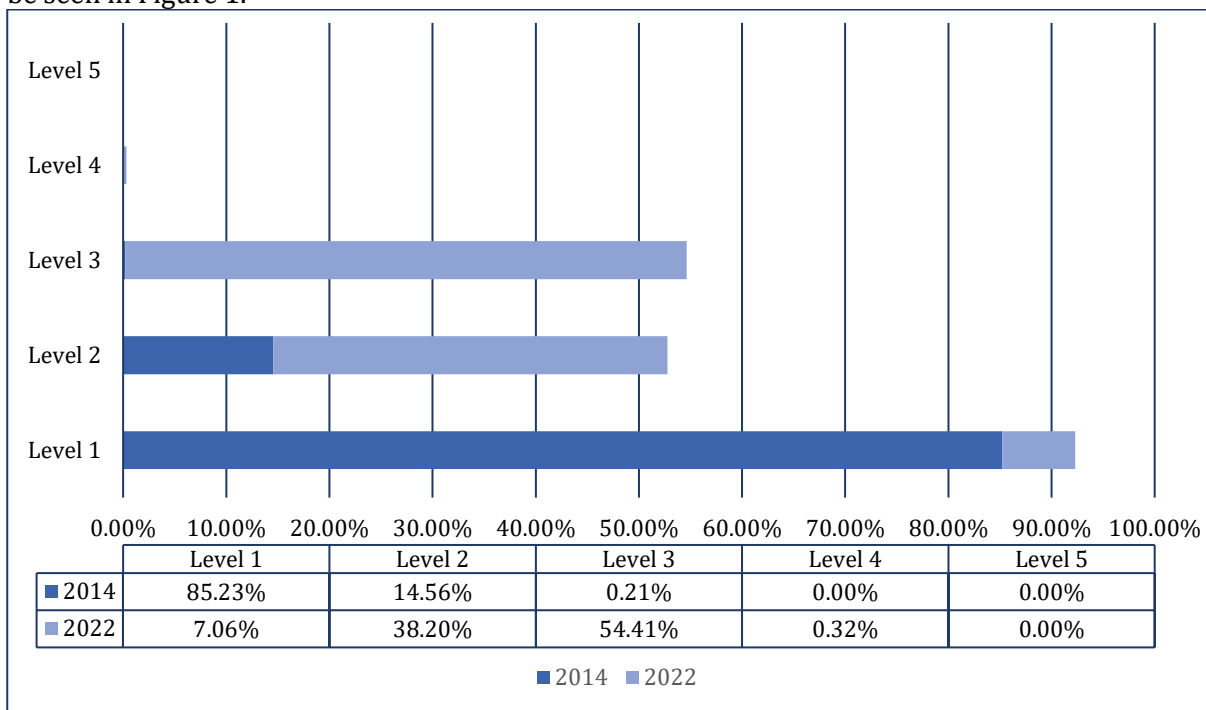

	Level 1	Level 2	Level 3	Level 4	Level 5
■2014	85.23%	14.56%	0.21%	0.00%	0.00%
■2022	7.06%	38.20%	54.41%	0.32%	0.00%

■2014 ■2022

Figure 1. Comparison of APIP Capability Level Conditions in 2014 and 2022
Source: BPKP Performance Report 2022 (processed)

According to BPKP (2021), the APIP at level 3 has been able to carry out supervisory activities in accordance with professional standards and practices, and the results of APIP supervision are already of good quality and provide reasonable assurance of compliance and 3E (economy, efficiency, and effectiveness), early warning and improvement of the effectiveness of risk management and improvement of governance for K/L/D organizations. Based on the data, it can be concluded that most APIPs today (54.74%) have had a fairly effective contribution to the organization.

Nonetheless, this capability level focuses more on the effectiveness aspect of the APIP role and does not analyze further whether the APIP has operated efficiently in achieving the effectiveness of its role. In fact, efficiency, alongside effectiveness, has been the main objective of state finance reform that has been mandated in the law. It is suggested that efficiency has been a core component of government reform. Implementing a reform often puts an advanced bureaucracy as a focus to

improve service delivery, which requires the government to be more efficient (Liou, 2017). Furthermore, higher government efficiency is necessary to give fiscal space to fulfill the increasing need for achieving sustainability (Baum et al., 2017).

Numerous studies discuss the role of APIP in supporting efficiency. In the context of listed public companies in Indonesia, Ardianto et al. (2023) found that the internal audit function only has a minor role in giving value-added service regarding investment decisions. Meanwhile, in the Polish public sector, Postula et al., (2020) found that the efficiency of internal audits plays a significant role in streamlining operations and adding value to the functioning of public administration in Poland regarding efficient public spending and public entities' completion of public service tasks. However, to the authors' best knowledge, the systematic empirical study that discusses the efficiency of APIP in Indonesia has never been concluded. It is paradoxical since APIP measures the effectiveness and efficiency of other units while APIP's efficiency itself is not much explored. For this reason, this study will analyze the efficiency of the internal control function by APIP K/L/D in order to determine which APIP has operated efficiently.

The study of efficiency measurement for APIP is arguably important. The highest level of internal audit capability model inspires APIP to be a key change agent and catalyst for the organization (Internal Audit Foundation, 2017). In other words, APIP acts as a role model for other units to conduct effective and efficient business. In addition, according to Presidential Regulation Number 54 of 2018 concerning the National Anti-Corruption Strategy, one of the challenges faced in the aspects of law enforcement and bureaucratic reform is the persistent lack of independence, oversight, and internal control within government institutions, including ministries, agencies, and regional and local governments (K/L/D). Thus, the study of APIP's efficiency could bring valuable insight for understanding the efficiency level among APIPs and use the most efficient APIP as a benchmark for other APIPs. Considering the importance of APIPs in preventing and detecting corruption, understanding the efficiency level is critical for the government to formulate a better policy for optimizing the resources of APIPs to enhance their capabilities in combating corruption in Indonesia.

Methods

The concept of efficiency permeates various disciplines since its measurement is crucial for understanding performance and identifying areas for improvement. Data Envelopment Analysis (DEA) has emerged as a powerful tool for quantifying efficiency, particularly in situations with multiple inputs and outputs. Emrouznejad & Yang (2018) list 9,881 DEA articles and research papers highlighting the use of DEA analysis from 1978 until the end of 2016. The top five application fields of DEA with the most journal articles in 2015 and 2016 include agriculture, banking, supply chain, transportation, and public policy.

Charnes et al. (1978) introduced DEA as a non-parametric frontier-based approach. It constructs an efficient frontier based on the observed data of decision-making units (DMUs), representing best practices. Each DMU is evaluated against this frontier, revealing its relative efficiency score, in which a score of 1 indicates full efficiency and scores below 1 imply inefficiency. This model was then known as DEA-CCR. It holds the assumption of constant return to scale, which means that if all inputs are proportionally increased, outputs will also increase proportionally. Later, Banker et al. (1984) developed the CCR model into the BCC model. It holds variable returns to scale assumption, which allows for different efficiency patterns at different output levels. The CCR model is preferred when DMUs are likely homogenous in terms of scale, while the BCC model is preferred when DMUs operate at different scales. Furthermore, Pradeep et al. (2020) concluded situations where CCR and BCC are applicable. The basic DEA approach using the CCR model is applied to the unitary evaluation of homogeneous units (rather than organizations). They also strongly recommend applying the BCC model for evaluating the efficiency of the public sector and private sector services businesses. This study will use the BCC model to analyze the efficiency level.

The main difficulty in any application of DEA is in the selection of inputs and outputs. The criteria for the selection of these inputs and outputs are quite subjective. There is no specific rule

in determining the procedure for the selection of inputs and outputs. Normally, inputs are defined as resources utilized by the DMUs or conditions affecting their performance, while outputs are the benefits generated as a result of the operation of the DMUs. For a meaningful study, it is important to restrict the total number of inputs and outputs to reasonable levels (R. Ramanathan, 2003). In this study, we use input and output data obtained from 50 APIPs in 2021 using purposive sampling, as depicted in Table 1 and Table 2. Sekaran and Bougie (2016) explain that purposive sampling is usually used when the samples are selected based on the criteria determined by the researcher. The criteria are (1) representing APIP at every level of government; (2) availability of data on the website, especially for the input variables; and (3) sufficient quantity requirements for the DEA analysis.

Table 1. List of DMUs

DMU No.	Unit of APIP	DMU No.	Unit of APIP
1.	Ministry of Religious Affairs	26.	Jakarta Province
2.	Ministry of Law and Human Rights	27.	West Java Province
3.	Ministry of Finance	28.	Central Java Province
4.	Ministry of Education and Culture	29.	Yogyakarta Province
5.	Ministry of Industry	30.	East Java Province
6.	Ministry of Energy and Mineral Resources	31.	Bali Province
7.	Ministry of Transportation	32.	West Nusa Tenggara Province
8.	Ministry of Agriculture	33.	East Nusa Tenggara Province
9.	Ministry of the Environment and Forestry	34.	West Kalimantan Province
10.	Ministry of Maritime Affairs and Fisheries	35.	South Kalimantan Province
11.	Ministry of Foreign Affairs	36.	Central Kalimantan Province
12.	Ministry of Villages, Disadvantaged Regions, and Transmigration	37.	East Kalimantan Province
13.	National Family Planning Coordinating Board	38.	North Kalimantan Province
14.	Indonesian Migrant Worker Protection Agency	39.	Central Sulawesi Province
15.	National Agency of Drug and Food Control	40.	South Sulawesi Province
16.	Central Agency of Statistics	41.	Maluku Province
17.	Aceh Province	42.	Denpasar City
18.	North Sumatera Province	43.	Serang City
19.	Riau Province	44.	Tangerang City
20.	Jambi Province	45.	Balikpapan City
21.	Riau Islands Province	46.	Klungkung Regency
22.	West Sumatera Province	47.	Belitung Regency
23.	Bangka Belitung Islands Province	48.	Boyolali Regency
24.	Lampung Province	49.	Surakarta City
25.	Banten Province	50.	Bandung City

Table 2. Data Types and Sources

		Description	Source
Input	X1	Number of APIP employees per number of K/L/D employees	Annual performance report from each APIP and K/L/D, statistics agencies (processed)
	X2	The sum of APIP goods expenditure budget per sum of K/L/D goods expenditure budget	Annual performance report and financial statements from each APIP and K/L/D (processed)
Output	Y1	K/L/D bureaucratic reform index	K/L/D annual performance report K/L/D, Ministry of State Apparatus Empowerment and Bureaucratic Reform (1data.menpan.go.id)
	Y2	K/L/D risk management index	Annual performance report of BPKP
	Y3	K/L/D integrity perception survey scores	The Corruption Eradication Commission (jaga.id)

In the input categories, the number of employees and goods expenditure budget ratios are used to handle the difference in the size of operations between APIPs. It follows Benazić (2012), who

utilizes the number of employees and the organization's cost as an input to measure the efficiency of customs service in Croatia. It also follows Kruger et al. (2002), who used labor and monetary value (costs) as input variables to analyze determinants of internal audit efficiency. It also aligns with the Ministry of Home Affairs' regulations (2019-2023), which use a ratio from total region expenditures in the local government budget that ranges between 0.3%-0.9% to calculate the supervision budget.

In the output categories, the variables are selected following Article 11 PP Number 60 of 2008 that states the following: the realization of the effective role of APIP must at least (1) provide adequate assurance of compliance, economy, efficiency, and effectiveness in achieving the objectives of the implementation of the tasks and functions of government agencies; (2) provide early warning and improve the effectiveness of risk management in the implementation of the tasks and functions of government agencies; and (3) maintain and improve the quality of governance in the implementation of the tasks and functions of government agencies. Thus, we use the bureaucratic reform, risk management, and integrity perception scores of the K/L/D to measure the effectiveness of APIPs. Those measures follow the expected contribution of APIPs mentioned in the law but also represent the outcome of anti-corruption efforts of K/L/D supported by APIP.

The bureaucracy reform is chosen as the output since it enhances the anti-corruption agenda due to the improvement of services from the government (Yustia & Arifin, 2023). The level of bureaucracy reforms is measured using the bureaucratic reform index initiated by Kemenpan-RB. The index is obtained from an assessment model based on Total Quality Management principles and is used as a method for conducting a comprehensive assessment and analysis of the performance of government agencies. The index varies on a scale of 1 to 100 and is obtained through self-assessment by K/L/D and then evaluated by the Ministry of State Apparatus Empowerment and Bureaucratic Reform (Kemenpan-RB, 2020).

Risk management is used as the output since it substantially influences the effort on fraud prevention and detection (Tarjo et al., 2022). The implementation of effective risk management may diagnose the potential of fraud and improve the control to prevent it (Bento et al., 2018). In this study, risk management is measured by the score of the risk management index that describes the quality of risk management implementation within the K/L/D scope obtained from calculating risk management assessment parameters. In the MRI assessment model, assessment parameters are grouped into three main components, namely planning, capability, and results. The index is obtained through self-assessment by management, quality assurance by APIP, and then evaluated by BPKP (BPKP, 2021).

The K/L/D integrity perception survey is used to assess corruption risk in K/L/D. The assessment comes from the perceptions and experiences of stakeholders in K/L/D, namely employees, service users and collaboration partners, and experts from various groups. The assessment includes transparency, integrity in carrying out duties, trading in influence, budget management, procurement, human resource management, and anti-corruption outreach in each agency. The survey results are in the form of numbers, which indicate the level of agency integrity on a scale of 1 to 100. The higher the integrity score of an agency, the better the system in place to detect corruption risks and handle corruption crimes in the K/L/D. (Yudha et al., 2021)

After the efficiency analysis using DEA, we extend our analysis by mapping out the level of efficiency and capability of APIPs using quadrant analysis. The analysis will divide each APIP into four quadrants based on the capabilities and efficiency score. Quadrant 1 reflects APIPs who are efficient and effective. Quadrant 2 means that APIPs achieve their effectiveness but are not quite efficient. Quadrant 3 means that APIPs are quite efficient but not effective, and Quadrant 4 places APIPs that are not efficient or effective.

Results and Discussion

This study uses five variables, including two inputs and three outputs, with 50 APIPs as the number of DMUs. Ramanathan (2003) suggests that the number of DMUs should be at least two or three times larger than the number of inputs and outputs. This is because DEA is a non-parametric technique that relies on the number of DMUs to estimate the efficient frontier. The larger the

number of DMUs, the more accurate the estimated frontier will be. Avkiran (2001) goes a step further and suggests that the number of DMUs should be larger than the product of the number of inputs and outputs. This is because it is possible for two DMUs to have the same number of inputs and outputs but have different levels of efficiency. By having more DMUs than the product of the number of inputs and outputs, it is more likely that the efficient frontier will be able to distinguish between these two DMUs. In this study, the number of DMUs (50) is more than the minimum suggested by Ramanathan (>18), and it is also larger than the product of the number of inputs and outputs (>6). The descriptive statistics for the input and output data can be seen in **Table 3**.

Table 3. Descriptive statistics for the input and output data

| Classification | Input | | | Output | |
	Employee ratio	Goods expenditure budget ratio	Bureaucratic reform index	Risk management index	Integrity perception survey scores
Max	0.074348	0.0224384	88.69	4.00	91.72
Min	0.001764	0.0003547	54.62	2.00	61.38
Mean	0.011955	0.0064918	70.27	2.62	75.89
Median	0.008920	0.0052122	68.88	3.00	76.56

The results of the analysis of the efficiency of 50 APIPs are shown in Table 4. Based on the test results, either with input or output oriented, there are 7 of 50 DMUs (14%) that get efficient results (efficiency score =1), and the remaining 43 DMUs are relatively inefficient. The average efficiency of entire DMUs is 0.42747 with input-oriented and 1.147 with output-oriented. This score indicates that there is still room for improvement.

Table 4. Efficiency Analysis Results and Summary

DMU No.	APIP Unit	Eff Score Input Oriented	Eff Score Output Oriented
1.	**Ministry of Religious Affairs**	**1,0000**	**1,000**
2.	Ministry of Law and Human Rights	0,9843	1,002
3.	**Ministry of Finance**	**1,0000**	**1,000**
4.	**Ministry of Education and Culture**	**1,0000**	**1,000**
5.	Ministry of Industry	0,2133	1,040
6.	Ministry of Energy and Mineral Resources	0,1461	1,063
7.	Ministry of Transportation	0,4819	1,117
8.	Ministry of Agriculture	0,2860	1,094
9.	Ministry of the Environment and Forestry	0,2905	1,115
10.	Ministry of Maritime Affairs and Fisheries	0,2486	1,070
11.	Ministry of Foreign Affairs	0,2464	1,039
12.	Ministry of Villages, Disadvantaged Regions, and Transmigration	0,0714	1,266
13.	**National Family Planning Coordinating Board**	**1,0000**	**1,000**
14.	Indonesian Migrant Worker Protection Agency	0,1874	1,105
15.	National Agency of Drug and Food Control	0,4310	1,019
16.	Central Agency of Statistics	0,7630	1,047
17.	Aceh Province	0,4234	1,272
18.	North Sumatera Province	0,3181	1,183
19.	Riau Province	0,1898	1,315
20.	Jambi Province	0,2018	1,338
21.	Riau Islands Province	0,1230	1,262
22.	West Sumatera Province	0,4473	1,134
23.	Bangka Belitung Islands Province	0,1501	1,240
24.	Lampung Province	0,1873	1,316
25.	Banten Province	0,1486	1,333
26.	**Jakarta Province**	**1,0000**	**1,000**
27.	West Java Province	0,2717	1,142
28.	**Central Java Province**	**1,0000**	**1,0000**
29.	Yogyakarta Province	0,6930	1,042
30.	East Java Province	0,7469	1,033

DMU No.	APIP Unit	Eff Score Input Oriented	Eff Score Output Oriented
31.	Bali Province	0,1839	1,158
32.	West Nusa Tenggara Province	0,2566	1,244
33.	East Nusa Tenggara Province	0,2862	1,226
34.	West Kalimantan Province	0,1916	1,250
35.	South Kalimantan Province	0,3259	1,186
36.	Central Kalimantan Province	0,2106	1,254
37.	East Kalimantan Province	0,2436	1,276
38.	North Kalimantan Province	0,1642	1,225
39.	Central Sulawesi Province	0,3558	1,169
40.	South Sulawesi Province	0,2733	1,254
41.	Maluku Province	0,2081	1,298
42.	Denpasar City	0,3224	1,092
43.	Serang City	0,1564	1,331
44.	Tangerang City	0,3908	1,159
45.	Balikpapan City	0,2260	1,263
46.	Klungkung Regency	0,7467	1,039
47.	Belitung Regency	0,6593	1,052
48.	**Boyolali Regency**	**1,0000**	**1,000**
49.	Surakarta City	0,7040	1,060
50.	Bandung City	0,2173	1,214

Result Summary	Eff Score Input Oriented	Eff Score Output Oriented
Minimal	0.07142	1,000
1st Quartile	0.20341	1.041
Median	0.28612	1.138
Mean	0.42747	1.147
3rd Quartile	0.68454	1.253
Maximal	1,000	1.338

Reference groups are naturally generated as outputs of DEA algorithms and represent efficient DMUs. If a DMU is efficient, it does not have a reference group. If a DMU is inefficient, then it has a reference group including at least one efficient DMU. For inefficient DMUs to become efficient DMUs, reference groups must be benchmarked to reduce or increase their input or output (Park & Kim, 2019). Table 5 shows the lambda (λ) value of the input-based BCC model. The lambda (λ) value is the weight of the reference DMU at which the efficiency frontier of the inefficient focal DMU is represented by the ratio of the reference DMU. Reference group DMUs are relatively close to the efficiency frontier of the focal DMU, and therefore, the reference DMUs have similar characteristics to the focal DMU. For example, DMU1 (Ministry of Religious Affairs), DMU3 (Ministry of Finance), DMU26 (Jakarta Province), and DMU28 (Central Java Province) are the reference groups for DMU2 (Ministry of Law and Human Rights.). The reference frequency of a DMU is the number of times it is used for the evaluation of other DMUs.

Table 5. The reference DMUs and lambda values of the BCC model

DMU	APIP Unit	BCC Eff Input Oriented	Reference DMU (λ)	Frequency of References
1	**Ministry of Religious Affairs**	**1,0000**		**24**
2	Ministry of Law and Human Rights	0,9843	D1(0,27); D3(0,27); D26(0.0023); D28(0.437)	
3	**Ministry of Finance**	**1,0000**		**22**
4	**Ministry of Education and Culture**	**1,0000**		**4**
5	Ministry of Industry	0,2133	D1(0,237); D3(0,416); D4(0.157); D48 (0.19)	
6	Ministry of Energy and Mineral Resources	0,1461	D1(0.244); D3(0,324); D26(0.038); D28(0.313); D48(0.08)	

DMU	APIP Unit	BCC Eff Input Oriented	Reference DMU (λ)	Frequency of References
7	Ministry of Transportation	0,4819	D1(0.115); D3(0.283); D4(0.034); D26(0.433); D48(0.134)	
8	Ministry of Agriculture	0,2860	D1(0.114); D3(0.335); D4(0.067); D26(0.33); D48(0.154)	
9	Ministry of the Environment and Forestry	0,2905	D3(0.206); D26(0.416); D28(0.171); D48(0.206)	
10	Ministry of Maritime Affairs and Fisheries	0,2486	D1(0.043); D3(0.215); D26(0.097); D28(0.473); D48(0.172)	
11	Ministry of Foreign Affairs	0,2464	D3(0.664); D26(0.148); D48(0.188)	
12	Ministry of Villages, Disadvantaged Regions, and Transmigration	0,0714	D26 (1)	
13	**National Family Planning Coordinating Board**	**1,0000**		**-**
14	Indonesian Migrant Worker Protection Agency	0,1874	D3(0.162); D26(0.283); D28(0.393); D48(0.162)	
15	National Agency of Drug and Food Control	0,4310	D1(0.183); D3(0.754); D48(0.062)	
16	Central Agency of Statistics	0,7630	D1(0.157); D3(0.391); D26(0.212); D28(0.006); D48(0.234)	
17	Aceh Province	0,4234	D1(0.372); D26(0.628)	
18	North Sumatera Province	0,3181	D26(0.954); D28(0.046)	
19	Riau Province	0,1898	D1(0.032); D26(0.968)	
20	Jambi Province	0,2018	D1(0.48); D26(0.52)	
21	Riau Islands Province	0,1230	D26(0.888); D28(0.112)	
22	West Sumatera Province	0,4473	D1(0.303); D26(0.554); D48(0.143)	
23	Bangka Belitung Islands Province	0,1501	D3(0.03); D26(0.815); D28(0.126); D48(0.03)	
24	Lampung Province	0,1873	D1(0.145); D26(0.855)	
25	Banten Province	0,1486	D26 (1)	
26	**Jakarta Province**	**1,0000**		**41**
27	West Java Province	0,2717	D3(0.016); D4(0.309); D26(0.455); D48(0.221)	
28	**Central Java Province**	**1,0000**		**18**
29	Yogyakarta Province	0,6930	D1(0.402); D3(0,402); D26(0.056); D28(0.139)	
30	East Java Province	0,7469	D1(0.312); D26(0.688)	
31	Bali Province	0,1839	D3(0,191); D26(0.609); D28(0.009); D48(0.191)	
32	West Nusa Tenggara Province	0,2566	D26 (1)	
33	East Nusa Tenggara Province	0,2862	D1(0.495); D26(0.505)	
34	West Kalimantan Province	0,1916	D1(0.105); D26(0.856); D48(0.039)	
35	South Kalimantan Province	0,3259	D1(0.37); D26(0.63)	
36	Central Kalimantan Province	0,2106	D1(0.342); D26(0.658)	
37	East Kalimantan Province	0,2436	D1(0.234); D26(0.766)	
38	North Kalimantan Province	0,1642	D1(0.262); D26(0.685); D48(0.053)	
39	Central Sulawesi Province	0,3558	D3(0,131); D26(0.579); D28(0.159); D48(0.131)	
40	South Sulawesi Province	0,2733	D1(0.339); D26(0.661)	

DMU	APIP Unit	BCC Eff Input Oriented	Reference DMU (λ)	Frequency of References
41	Maluku Province	0,2081	D1(0.563); D26(0.437)	
42	Denpasar City	0,3224	D3(0,266); D26(0.309); D28(0.158); D48(0.266)	
43	Serang City	0,1564	D26 (1)	
44	Tangerang City	0,3908	D3(0,17); D26(0.58); D28(0.08); D48(0.17)	
45	Balikpapan City	0,2260	D3(0,03); D26(0.928); D28(0.013); D48(0.03)	
46	Klungkung Regency	0,7467	D3(0,156); D26(0.008); D28(0.681); D48(0.156)	
47	Belitung Regency	0,6593	D3(0,025); D26(0.056); D28(0.894); D48(0.025)	
48	**Boyolali Regency**	**1,0000**		**23**
49	Surakarta City	0,7040	D3(0,279); D26(0.119); D28(0.322); D48(0.279)	
50	Bandung City	0,2173	D1(0,018); D26(0.982)	

After obtaining the efficiency test results and based on APIP capability score data in Appendix A, we conduct a quadrant analysis to classify the DMUs into four quadrants. As shown in Figure 2, the samples fall into three categories. The DMUs in category I are divided into two subcategories where seven DMUs have high capabilities and could perform their duty relatively efficiently with an efficiency score = 1 (category I.1) and another seven DMUs with an efficiency score above 0.5 (category I.2). In Category II, DMUs have high capabilities with low-efficiency scores (< 0.5) relative to other DMUs. In the third category, DMUs have low capability and low efficiency scores (< 0.5) relative to other DMUs. The detailed results and list of DMUs' categories are shown in Appendix B.
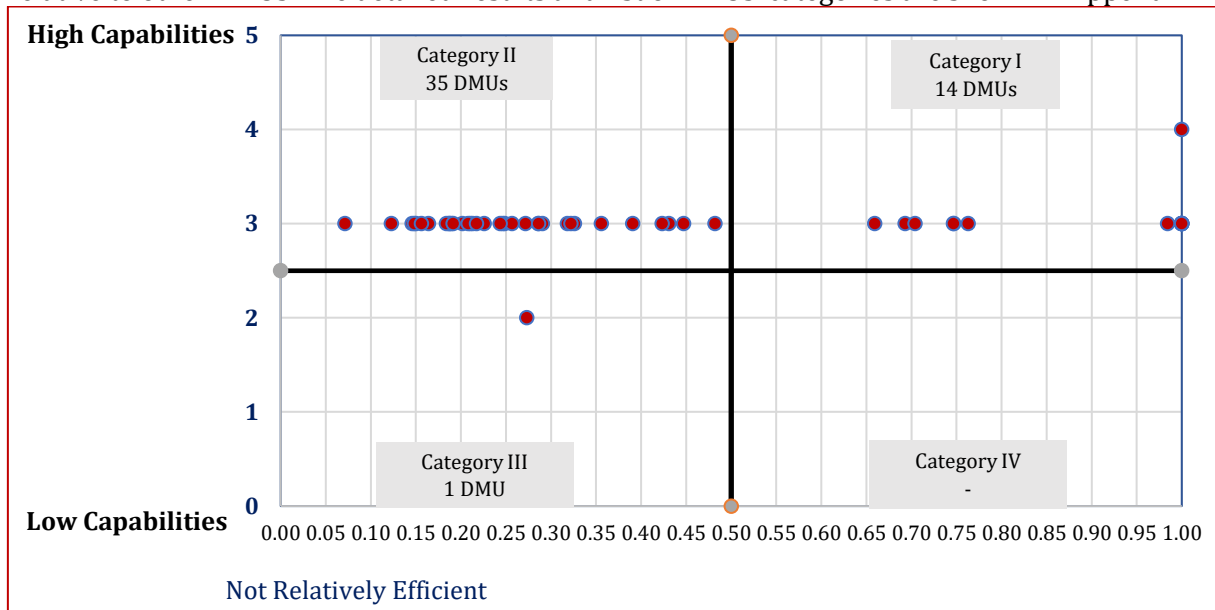

Figure 2. Quadrant Analysis for Capability and Efficiency of APIP

This result indicates that even though APIPs are at the same capability level, they vary greatly in the use of resources in carrying out their roles. Category I.I is filled by seven relatively efficient APIPs (efficiency score = 1), namely DMU 1, 3, 4, 13, 26, 28, and 48. The data shows that the input utilization is relatively low, and output attainment in these DMUs is relatively higher compared to the average of others. This comparison can be seen in Table 6.

As shown in Table 6, the mean of all the input and output for the category II and III DMUs are below the data mean. It shows that the use of inputs is relatively high while the attainment of the outputs in these DMUs is relatively lower compared to the DMUs in categories I.1 and I.2. It is indicated that the difference lies in variations in work processes and methodologies of APIPs which can vary across all stages of the supervision process, starting from the planning stage to determin-

ing the objects, the formulation of work programs, the implementation, and the reporting of oversight results. In determining oversight objects, it should ideally be based on risk, considering the human resources and budgets (Le et al., 2022) and the implementation of oversight that can utilize information technology to optimize the supervision process and minimize the input (Keskinen & Tarwireyi, n.d.; Shaikh et al., 2018).

Table 6. Input and Output Data in Each Categories

Categories	Input Mean		Output Mean		
	Employee ratio	Goods expenditure budget ratio	Bureaucratic reform index	Risk management index	Integrity perception survey scores
I.1	0,0043	0,0033	77,01	2,71	81,97
I.2	0,0059	0,0050	71,96	2,86	79,99
II	0,0147**	0,0073**	69,75**	2,58**	74,62**
III	0,0067**	0,0076**	61**	2**	70,61**
Data mean*	0.0119	0.0065	70.27	2.62	75.89

*obtained from Table 3
** above the mean for input and below the mean for output

These results convinced the necessity for inclusivity in the execution of oversight roles by APIPs, particularly those situated within Quadrant I. The role of professional organizations of APIPs (AAIPI) and BPKP as their overseeing body is also anticipated to accelerate the enhancement of APIPs.

Conclusion

The important role of APIP is acknowledged by the government by putting APIPs as the focal point in maintaining internal control as well as in preventing and detecting corruption. Unlike any other agencies, APIP in Indonesia's governmental system exists in all agencies from the central to the regional level, which indicates the fundamental role of APIP in the organization. However, this study concludes that the efficiency level of APIPs in Indonesia is still low. Using Data Envelopment Analysis (DEA) and purposive sampling of 50 APIPs at the central and regional levels, this study finds only seven APIPs (14%) achieved a maximum efficiency level with a score of 1. Those are APIPs in the Ministry of Religious Affairs, Ministry of Finance, Ministry of Education and Culture, National Family Planning Coordinating Board, the Jakarta Province, the Central Java Province, and the Boyolali Regency. Furthermore, this study also set out those APIPs as a reference group for other APIPs to carry out a benchmark based on the similarity of inputs and outputs. For example, the APIP of the Ministry of Law and Human Rights, whose efficiency score is not optimal, could learn from the APIP of the Ministry of Religious Affairs, Ministry of Finance, Jakarta Province, and Central Java Province. Moreover, this study also analyzes the efficiency level of APIPs and their capability. It finds that 14 APIPs are relatively efficient and capable, while 35 APIPs are capable but not relatively efficient, and one APIP is not capable or efficient. It is suggested that APIP's approach to planning, executing, and reporting processes may influence the level of its efficiency.

One limitation of this study is the result only covers the year 2021 and 50 APIPs due to the availability of data. Some data related to the number of APIP employees and the realization of goods expenditure are not publicly available. The absence of this information may indicate that the level of transparency, one important element for good governance, is still inadequate among government institutions. It causes the comparison of efficiency between APIPs at the central and regional levels to not be reliably concluded. Furthermore, the input used in the analysis only depicts the number but does not define its quality, such as the quality of government spending and the quality of human resources. The measurement of output is also taken directly from APIP's mandate in PP 60/2008, which may be biased due to external factors besides APIP's role. Thus, future research could be improved by extending the sample of APIPs and periods covered, as well as considering the quality of inputs and the measurement of outputs that can be isolated from other external factors. Despite its limitations, it could be argued that this study will enrich the theoretical framework regarding APIP's efficiency, which is still relatively unexplored. This study

also gives a practical implication for the government to put serious effort into improving the efficiency level of APIPs to make the available resources allocated for APIPs optimally utilized to support good governance and clean government in Indonesia.

References

Ardianto, A., Anridho, N., Ngelo, A. A., Ekasari, W. F., & Haider, I. (2023). Internal audit function and investment efficiency: Evidence from public companies in Indonesia. *Cogent Business and Management*, *10*(2). https://doi.org/10.1080/23311975.2023.2242174

Association of Certified Fraud Examiners. (2022). *Occupational Fraud 2022: A REPORT TO THE NATIONS ®*.

Avkiran, N. K. (2001). Investigating technical and scale efficiencies of Australian Universities through data envelopment analysis. In *Socio-Economic Planning Sciences* (Vol. 35).

Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. In *Source: Management Science* (Vol. 30, Issue 9).

Baum, A., Hodge, A., Mineshima, A., Moreno Badia, M., & Tapsoba, R. (2017). *Can they do it all? Fiscal Space in Low-Income Countries*.

Benazić, A. (2012). *Measuring efficiency in the Croatian customs service: a data envelopment analysis approach*. *36*(2), 139–178. https://doi.org/10.3326/fintp.36.2

Bento, R. F., Mertins, L., & White, L. F. (2018). Risk management and internal control: A study of management accounting practice. In *Advances in Management Accounting* (Vol. 30, pp. 1–25). Emerald Group Publishing Ltd. https://doi.org/10.1108/S1474-787120180000030002

Charnes, A., Cooper, W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. In *Company European Journal of Operational Research* (Vol. 2).

Diamond, J. (2002). *The role of internal audit in government financial management: An international perspective International Monetary Fund*.

Emrouznejad, A., & Yang, G. liang. (2018). A survey and analysis of the first 40 years of scholarly literature in DEA: 1978–2016. *Socio-Economic Planning Sciences*, *61*, 4–8. https://doi.org/10.1016/j.seps.2017.01.008

Hay, D., & Cordery, C. (2018). The value of public sector audit: Literature and history. *Journal of Accounting Literature*, *40*, 1–15. https://doi.org/10.1016/j.acclit.2017.11.001

Internal Audit Foundation. (2017). *Internal Audit Capability Model (IA-CM) For The Public Sector*.

Jeppesen, K. K. (2019). The role of auditing in the fight against corruption. *British Accounting Review*, *51*(5). https://doi.org/10.1016/j.bar.2018.06.001

Keskinen, M., & Tarwireyi, R. C. (n.d.). *Automation and the transformation of the audit process A qualitative research on the impact of automation on the audit process*.

Kruger, H. A., Steyn, P. J., & Kearney, W. (2002). Determinants of internal audit efficiency. *South African Journal of Business Management*, *33*(3), 53–62. https://doi.org/10.4102/sajbm.v33i3.705

Le, T. T., Nguyen, T. M. A., Do, V. Q., & Ngo, T. H. C. (2022). Risk-based approach and quality of independent audit using structure equation modeling – Evidence from Vietnam. *European Research on Management and Business Economics*, *28*(3). https://doi.org/10.1016/j.iedeen.2022.100196

Liou, K. T. (2017). Government reform, public governance, and Chinese economic development. *Journal of Chinese Governance*, *2*(3), 255–270. https://doi.org/10.1080/23812346.2017.1342871

Park, H. S., & Kim, D. (2019). Efficiency analysis of East Asian zinc smelters and the effects of capacity and bonus zinc on efficiency. *Journal of Open Innovation: Technology, Market, and Complexity*, *5*(1). https://doi.org/10.3390/joitmc5010004

Paterson, A. S., Changwony, F., & Miller, P. B. (2019). Accounting control, governance and anti-corruption initiatives in public sector organisations. In *British Accounting Review* (Vol. 51, Issue 5). Academic Press. https://doi.org/10.1016/j.bar.2019.100844

Peraturan Badan Pengawasan Keuangan Dan Pembangunan Nomor 8 Tahun 2021 Tentang Penilaian Kapabilitas Aparat Pengawasan Intern Pemerintah Pada Kementerian/ Lembaga/ Pemerintah Daerah (2021).

Peraturan Kepala Badan Pengawasan Keuangan Dan Pembangunan Nomor 5 Tahun 2021 Tentang Penilaian Maturitas Penyelenggaraan Sistem Pengendalian Intern Pemerintah Terintegrasi Pada Kementerian/Lembaga/Pemerintah Daerah (2021).

Peraturan Kepala Badan Pengawasan Keuangan Dan Pembangunan Nomor 6 Tahun 2015 Tentang Grand Design Peningkatan Kapabilitas Aparat Pengawasan Intern Pemerintah Tahun 2015-2019 (2015).

Peraturan Menteri Dalam Negeri Nomor 15 Tahun 2023 Tentang Pedoman Penyusunan Anggaran Pendapatan Dan Belanja Daerah Tahun Anggaran 2024 (2023).

Peraturan Menteri Dalam Negeri Nomor 27 Tahun 2021 Tentang Pedoman Penyusunan Anggaran Pendapatan Dan Belanja Daerah Tahun Anggaran 2022 (2021).

Peraturan Menteri Dalam Negeri Nomor 33 Tahun 2019 Tentang Pedoman Penyusunan Anggaran Pendapatan Dan Belanja Daerah Tahun Anggaran 2020 (2019). www.peraturan.go.id

Peraturan Menteri Dalam Negeri Nomor 64 Tahun 2020 Tentang Pedoman Penyusunan Anggaran Pendapatan Dan Belanja Daerah Tahun Anggaran 2021 (2020).

Peraturan Menteri Dalam Negeri Nomor 84 Tahun 2022 Tentang Pedoman Penyusunan Anggaran Pendapatan Dan Belanja Daerah Tahun Anggaran 2023 (2022). www.peraturan.go.id

Peraturan Menteri Pendayagunaan Aparatur Negara Dan Reformasi Birokrasi Nomor 26 Tahun 2020 Tentang Pedoman Evaluasi Pelaksanaan Reformasi Birokrasi (2020).

Peraturan Menteri Pendayagunaan Aparatur Negara Dan Reformasi Birokrasi Nomor 90 Tahun 2021 Tentang Pembangunan Dan Evaluasi Zona Integritas Menuju Wilayah Bebas Dari Korupsi Dan Wilayah Birokrasi Bersih Dan Melayani Di Instansi Pemerintah (2021).

Postula, M., Irodenko, O., & Dubel, P. (2020). Internal Audit as a Tool to Improve the Efficiency of Public Service. In *European Research Studies Journal: Vol. XXIII* (Issue 3).

Pradeep, P., Bilal, P., Khan[2], M., & Kachwala[3], T. (2020). Data Envelopment Analysis-Is BCC model better than CCR model? Case of Indian Life Insurance companies. *NMIMS Management Review*, *XXXVIII*(1).

R. Ramanathan. (2003). *An introduction to data envelopment analysis*.

Saptono, P. B., & Purwanto, D. (2022). Factors causing the ineffectiveness of Good Corporate Governance in preventing Corruption in State-Owned Enterprises. *Integritas : Jurnal Antikorupsi*, *8*(1), 77–94. https://doi.org/10.32697/integritas.v8i1.870

Sekaran, U., & Bougie, R. (2016). *Research Methods for Business: Vol. Seventh Edition*. www.wileypluslearningspace.com

Shaikh, H., Jokhio, M. U., Maher, Z. A., Chandio, S., Bin Abdullah, M. M., Raza, A., Salam, S., & Shah, A. (2018). Beyond traditional audits: The implications of information technology on auditing. *International Journal of Engineering and Technology(UAE)*, *7*(2), 5–11. https://doi.org/10.14419/ijet.v7i2.34.13897

Tarjo, T., Vidyantha, H. V., Anggono, A., Yuliana, R., & Musyarofah, S. (2022). The effect of enterprise risk management on prevention and detection fraud in Indonesia's local government. *Cogent Economics and Finance*, *10*(1). https://doi.org/10.1080/23322039.2022.2101222

The Financial and Development Supervisory Board. (2022). *Laporan Kinerja Badan Pengawasan Keuangan dan Pembangunan Tahun 2022*.

Turner, M., Prasojo, E., & Sumarwono, R. (2022). The challenge of reforming big bureaucracy in Indonesia. *Policy Studies*, *43*(2), 333–351. https://doi.org/10.1080/01442872.2019.1708301

Undang-Undang Nomor 17 Tahun 2003 Tentang Keuangan Negara (2003).

van Brenk, H., Renes, R., & Trompeter, G. M. (2022). Auditing in the public interest: Reforming the profession by building on the strengths of the existing accounting firms. *Critical Perspectives on Accounting*, *83*. https://doi.org/10.1016/j.cpa.2020.102184

Yudha, A., Tri, W., Sari, G., Timotius, A., Partohap, H., Dewantara, W., Anis, S., Dicky, W., Alfarisi, A., Ayu, B., Ganther, S., Ariotejo, R., Kuningan, J., & Kav, P. (2021). *Laporan Survei Penilaian Integritas 2021*. www.kpk.go.id

Yustia, D. A., & Arifin, F. (2023). Bureaucratic reform as an effort to prevent corruption in Indonesia. *Cogent Social Sciences*, *9*(1). https://doi.org/10.1080/23311886.2023.2166196

APPENDIX A. THE EFFICIENCY TEST RESULT AND CAPABILITY SCORE DATA

DMU No	APIP Unit	Eff Score Input Oriented	Eff Score Output Oriented	Capability Level
1	**Ministry of Religious Affairs**	**1,0000**	**1,000**	**3**
2	Ministry of Law and Human Rights	0,9843	1,002	3
3	**Ministry of Finance**	**1,0000**	**1,000**	**4**
4	**Ministry of Education and Culture**	**1,0000**	**1,000**	**3**
5	Ministry of Industry	0,2133	1,040	3
6	Ministry of Energy and Mineral Resources	0,1461	1,063	3
7	Ministry of Transportation	0,4819	1,117	3
8	Ministry of Agriculture	0,2860	1,094	3
9	Ministry of the Environment and Forestry	0,2905	1,115	3
10	Ministry of Maritime Affairs and Fisheries	0,2486	1,070	3
11	Ministry of Foreign Affairs	0,2464	1,039	3
12	Ministry of Villages, Disadvantaged Regions, and Transmigration	0,0714	1,266	3
13	**National Family Planning Coordinating Board**	**1,0000**	**1,000**	**3**
14	Indonesian Migrant Worker Protection Agency	0,1874	1,105	3
15	National Agency of Drug and Food Control	0,4310	1,019	3
16	Central Agency of Statistics	0,7630	1,047	3
17	Aceh Province	0,4234	1,272	3
18	North Sumatera Province	0,3181	1,183	3
19	Riau Province	0,1898	1,315	3
20	Jambi Province	0,2018	1,338	3
21	Riau Islands Province	0,1230	1,262	3
22	West Sumatera Province	0,4473	1,134	3
23	Bangka Belitung Islands Province	0,1501	1,240	3
24	Lampung Province	0,1873	1,316	3
25	Banten Province	0,1486	1,333	3
26	**Jakarta Province**	**1,0000**	**1,000**	**3**
27	West Java Province	0,2717	1,142	3
28	**Central Java Province**	**1,0000**	**1,0000**	**3**
29	Yogyakarta Province	0,6930	1,042	3
30	East Java Province	0,7469	1,033	3
31	Bali Province	0,1839	1,158	3
32	West Nusa Tenggara Province	0,2566	1,244	3
33	East Nusa Tenggara Province	0,2862	1,226	3
34	West Kalimantan Province	0,1916	1,250	3
35	South Kalimantan Province	0,3259	1,186	3
36	Central Kalimantan Province	0,2106	1,254	3
37	East Kalimantan Province	0,2436	1,276	3
38	North Kalimantan Province	0,1642	1,225	3
39	Central Sulawesi Province	0,3558	1,169	3
40	South Sulawesi Province	0,2733	1,254	2
41	Maluku Province	0,2081	1,298	3
42	Denpasar City	0,3224	1,092	3
43	Serang City	0,1564	1,331	3
44	Tangerang City	0,3908	1,159	3
45	Balikpapan City	0,2260	1,263	3
46	Klungkung Regency	0,7467	1,039	3
47	Belitung Regency	0,6593	1,052	3
48	**Boyolali Regency**	**1,0000**	**1,000**	**3**
49	Surakarta City	0,7040	1,060	3
50	Bandung City	0,2173	1,214	3

APPENDIX B. THE CAPABILITIES AND EFFICIENCY LEVEL QUADRANT OF APIP

DMU No	APIP Unit	Eff Score Input Oriented	Capability Level	Category
1	**Ministry of Religious Affairs**	**1,0000**	**3**	**I.1**
2	Ministry of Law and Human Rights	0,9843	3	I.2
3	**Ministry of Finance**	**1,0000**	**4**	**I.1**
4	**Ministry of Education and Culture**	**1,0000**	**3**	**I.1**
5	Ministry of Industry	0,2133	3	II
6	Ministry of Energy and Mineral Resources	0,1461	3	II
7	Ministry of Transportation	0,4819	3	II
8	Ministry of Agriculture	0,2860	3	II
9	Ministry of the Environment and Forestry	0,2905	3	II
10	Ministry of Maritime Affairs and Fisheries	0,2486	3	II
11	Ministry of Foreign Affairs	0,2464	3	II
12	Ministry of Villages, Disadvantaged Regions, and Transmigration	0,0714	3	II
13	**National Family Planning Coordinating Board**	**1,0000**	**3**	**I.1**
14	Indonesian Migrant Worker Protection Agency	0,1874	3	II
15	National Agency of Drug and Food Control	0,4310	3	II
16	Central Agency of Statistics	0,7630	3	I.2
17	Aceh Province	0,4234	3	II
18	North Sumatera Province	0,3181	3	II
19	Riau Province	0,1898	3	II
20	Jambi Province	0,2018	3	II
21	Riau Islands Province	0,1230	3	II
22	West Sumatera Province	0,4473	3	II
23	Bangka Belitung Islands Province	0,1501	3	II
24	Lampung Province	0,1873	3	II
25	Banten Province	0,1486	3	II
26	**Jakarta Province**	**1,0000**	**3**	**I.1**
27	West Java Province	0,2717	3	II
28	**Central Java Province**	**1,0000**	**3**	**I.1**
29	Yogyakarta Province	0,6930	3	I.2
30	East Java Province	0,7469	3	I.2
31	Bali Province	0,1839	3	II
32	West Nusa Tenggara Province	0,2566	3	II
33	East Nusa Tenggara Province	0,2862	3	II
34	West Kalimantan Province	0,1916	3	II
35	South Kalimantan Province	0,3259	3	II
36	Central Kalimantan Province	0,2106	3	II
37	East Kalimantan Province	0,2436	3	II
38	North Kalimantan Province	0,1642	3	II
39	Central Sulawesi Province	0,3558	3	II
40	South Sulawesi Province	0,2733	2	III
41	Maluku Province	0,2081	3	II
42	Denpasar City	0,3224	3	II
43	Serang City	0,1564	3	II
44	Tangerang City	0,3908	3	II
45	Balikpapan City	0,2260	3	II
46	Klungkung Regency	0,7467	3	I.2
47	Belitung Regency	0,6593	3	I.2
48	**Boyolali Regency**	**1,0000**	**3**	**I.1**
49	Surakarta City	0,7040	3	I.2
50	Bandung City	0,2173	3	II