

# Developing Modified PeGI Indicators for e-Government Ranking Method

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**Abstract** — e-Government Ranking of Indonesia (Pemeringkatan e-Government Indonesia - PeGI) is conducted in order to determine and evaluate the success of e-Government implementation nationally. However, the parameters that have been used by PeGI in evaluating government offices were too general. Some more detail exploration regarding the parameters for ranking the Government office is necessary to determine the level of PeGI in more detail and objective judgement. Due to that, this research was done to get more details indicators on PeGI ratings that can evaluate the success level of e-Government implementation in government office and also to minimize the improper assessment. In this study, the modified PeGI indicators were developed based on COBIT 5 standard. Questionnaire with detail indicators as a result of PeGI modification was used to re-rank some government offices sample. The result of ranking then being compared with the rank of current PeGI. This study resulted: 164 questions in the modified questionnaire, each on Policy Dimension (8 categories) 39 questions, Institutional Dimension (5 categories) 19 questions, Infrastructure Dimension (7 categories) 44 questions, Application Dimension (5 categories) 41 questions, and Planning Dimension (5 categories) 21 questions. In conclusion, we found that the final result of Modified PeGI ranking for Surabaya City Government was lower compared to normal PeGI ranking. Detail indicators can describe e-Government implementation in a more objective way.

**Keyword:** e-Government ranking, Good Governance, PeGI, Modified PeGI, SKPD ranking

## I. INTRODUCTION

e-Government has been an important issue in the recent years in Indonesia. It has been the standard for running good governance in term of efficiency and effectivity nationally.

The goal of its implementation is to increase the quality of service to the society effectively and efficiently (E.Vaandijk). From 2004 to 2010, Indonesia experienced a degeneration ranking according the World e-Government (Sosiawan). The implementation of e-Government in Indonesia is still not equally distributed among local offices and not performed well. One example is the achievement of Ambon City in 2013 in the ranking of e-Government of Indonesia (PeGI). With five evaluation dimensions: Policies, Institutions, Infrastructure, Application, and Planning, Ambon City only got an avarage score level 1,98. It is mostly caused by the obstacles in the government's priorities and initiatives in anticipating of technology advances. To evaluate this matter, government of Indonesia through the Ministry of Communications and Information Technology implemented Indonesia e-Government Rankings or called PeGI. The main goal of PeGI is to become a reference of development and use of ICT so that good governance can be run efficiently. However, PeGI assessment hasn't been considered as a comprehensive approach due to lack of detail in the assessment indicators that can generate inaccuracies in the assessment result. In this research, new ranking system with a more detail indicators will be developed through modification of the existing PeGI indicators with references to COBIT 5. The main goal of this study is to gain more accuracies in assessment of e-government implementation compared to the original PeGI.

## II. METHODOLOGY

The flow work of this study is shown in figure 1 :

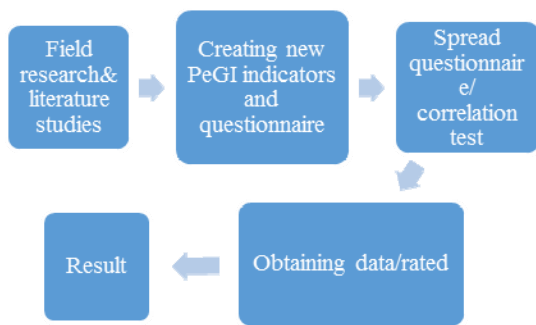


Figure 1. the Flow work

### A. Data preparation

Before modificating PeGI indicators by breakdowning into more detail factors, first step is analyzing the e-Government, Good Governance and PeGI implementation such as Interviews with one of the PeGI assessor to find out information about PeGI including the way of PeGI assessment. From the interviews result, authors found that there were some differences in preception between the PeGI assessors and the participants in the assessment. This is due to facts that PeGI indicators that were used were too general and lack of spesific indicators. Observation and interviews were conducted in order to find the match between the new indicators with the real condition in the field.

### B. PeGi Modification and Questionnaire

The algorithm for modifying PeGI was described below:

- a. Modification of PeGI indicators was started with analyzing the PeGI assessment indicators.
- b. Next step is modifying the indicators by selecting the indicators that correspond with the results of observations and interviews, besides referencing to COBIT 5 standard. Other references were also used such as Indonesian 1945 Constitution, Regulation on Information and Electronic Transactions, by the Minister of Communication and Information Technology.
- c. After modifying by extending a more detail assessment indicators, the next process is to create questionnaire, the guidance and form of assessment that will be used as a device to collect data and ranking. The questionnaire were created based on the indicators/sub-indicators that have been more detail.

### C. The Spread of Modified Questionnaire/indicators testing

In this research the respondents were selected by probability sample where each respondent in this case, The Regional Work Units (SKPD) has an equal chance for being

a sample. On the other hand in filling out the questionnaire, respondents were selected by purposive sampling where respondents who filled out the questionnaire determined by the researcher under the conditions that those who filled it should be responsible and know well about the real conditions of ICT implementation in SKPD.

In order to check the suitability of indicators which was detailed with the condition in the field and to collect data for the validity of the indicators, some steps below were taken:

- Questionnaires were arranged according to the result of the indicators that have been spread early in 29 SKPDs of Surabaya City Government.
- Next step is questionnaire testing. The questionnaire testing was conducted using *Bivariate Pearson Correlation*. The indicators testing was done to determine the validity of the indicators that have been selected and prepared from the questionnaire. The formula of *Bivariate Pearson Correlation*, as follow: (aswar, 1997)

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{\left(\sum x^2 - \frac{(\sum x)^2}{n}\right) \left(\sum y^2 - \frac{(\sum y)^2}{n}\right)}}$$

where  $r$  : Pearson correlation coefficient  
 $x$  : score of the item in question  
 $y$  : score all items of questions  
 $\sum x$  : total score of the item in question  
 $\sum y$  : total score of all items

The correlation between the value of the questions compared to the total value of the question in one indicator. Valid if the correlation is positive, signification = 0,000. Validation test will remove invalid items in questionnaires and keep the valid indicators.

- The final step is to improve assessment guidelines adapted to the indicators/ sub-indicators that have been be detailed.

### D. Data Management

At this stage, collecting data is done for ranking the implementation of e-Government at SKPD in the Surabaya City Government and in the Ambon City Government. Data collection methods and techniques were conducted in order to collect data at this stage through questionnaires and interviews, while the required data should be in quantitative data form. The questionnaire that was spread to all SKPD were then being collected, checked and then rated with a given value per indicators according to the assessment guidance of the PeGI that have been rearranged in accordance with the indicators that have been modified. At this stage, the data processing for ranking in this research processing data is conducted from the result of the questionnaire. The ranking

can be done through assessment process which generally was used by PeGI.

TABLE 1. INDICATORS RATING

Value	Category	Explanation
$X \leq 1.50$	Very Less	the indicator doesn't exist or very less in terms of quantity and quality
$1.5 < X \leq 2.50$	Less	indicators already exist, but they are less in number and need to be improved in quality
$2.5 < X \leq 3.5$	Good	indicator numbered and quite have a good quality and has a positive impact on the use of e-Government, but still need to be improved to sustain the implementation of e-Government in the future
$> 3.50$	Very Good,	a very good indicator from quality or even quantity. The impact on the implementation of e-Government looks so real. Preparation to develop in the future are already visible

To analyze the comparison between the PeGI questionnaire and Modified PeGI questionnaire which one that considered better to use, a questionnaire was spread to 29 SKPD in Surabaya City Government and 30 SKPD in Ambon City Government. Each SKPD was given PeGI questionnaire and Modified PeGI questionnaire that contain 4 questions.

### III. RESULT

The Modified PeGI assessment indicators that was constructed based on the COBIT 5 standard, other references such as national regulation, and the results of observations and interviews, was shown on table 2:

TABLE 2. RESULTS OF MODIFIED PEGI INDICATORS

1	Policy	8 sub dimension	8 indicator	8 sub dimension (39 indicator)
2	Institutional	5 sub dimension	5 indicator	5 sub dimension (19 indicators & 3 sub indicator)
3	Infrastructure	7 sub dimension	26 indicator	7 sub dimension (40 indicator & 14 sub indicator)
4	Application	10 sub dimension	10 indicator	5 sub dimension (35 indicator & 26 sub indicator)
5	Planning	5 sub dimension	5 indicator	5 sub dimension (21 indicator & 7 sub indicator)

The indicators produced on the modification as for sample we can see on table 5.

#### A. Questionnaire

The questionnaire was created based on the indicators/ sub-indicators that have been more detail. There

are 164 questions in the modified questionnaire, each on Policy Dimension (8 categories) 39 questions, Institutional Dimension (5 categories) 19 questions, Infrastructure Dimension (7 categories) 44 questions, Application Dimension (5 categories) 41 questions, and Planning Dimension (5 categories) 21 questions.

#### B. Questionnaire Test

The validity of modified PeGI indicator using *Pearson Correlation* result as for sample, seen on table 4:

TABLE 4. SAMPLE VALIDITY INDICATORS USING PEARSON CORRELATION

Institutional Dimension			
Indicator	Question	Correlation	Explanation
human Resource development	Human Resource Development Programme (ICT-based). Evaluation of the program of the implementation on a regular basis.	0,972	Valid
		0,974	Valid
Planning Dimension			
Indicator	Question	Correlation	Explanation
ICT Planning System	Guidance on the governance of ICT planning process.	0,955	Valid
	Plan for the development of ICT	0,096	Valid
	Study of ICT planning activities.	0,097	Valid

#### C. The comparison between the PeGI and Modified PeGI

To analyze the comparison between the PeGI questionnaire and Modified PeGI questionnaire, a questionnaire was spread to 29 SKPD in Surabaya City Government and 30 SKPD in Ambon City Government. Each SKPD have been given PeGI questionnaire and Modified PeGI questionnaire that contains 4 questions. The results collected from those 4 questions, Modified PeGI Questionnaire got highest percentage, the results of question easy to understand got 77.59%, enables charging got 79.31%, more details in outlining 5 PeGI dimensions got 75.86% and can be used to equalize perception both assessor and respondent got 77.59%. The detail results can be seen in the table 6.

TABLE 5. MODIFIED PEGI INDICATORS

Policy Dimension			
PeGI Dimension Sub	PeGI Indicator	Modified PeGI Indicator	Source
Risk Management/ Evaluation of ICT	Independent and internal evaluations	1. Tutorial risk control by the chairman of the institution	Regulation of the Minister of Information and Communication Number 4, 2016 on Information Security Management System
			Chapter I, Passage 1 (8) Risks are events or unwanted conditions, which can have negative impacts on the achievement of performance Electronic Systems targets service
			Passage 2: Regulation of the implementation of the Information Security Management System Operator Electronic System for Public Service based on the principle of Risk
			<b>Align, Plan and Organize (APO). COBIT 5</b> APO12 Manage Risk (mengelola risiko)
		2. Risk control Monitoring	Regulation of the Minister of Information and Communication Number 4 2016 about Information Security Management System
			<b>Monitor, Evaluate and Assess (MEA). COBIT 5</b> MEA01 Monitor, Evaluate and Assess Performance and Conformance
			Law of the Republic of Indonesia Number 11, 2008 on Information and Electronic Transactions. e-Government Regulation in the Implementation of Electronic Systems
			The implementation of the Electronic System Software Organizer for Public Service based on the principle of risk
		3. cted regularly evaluations	<b>Evaluate, Direct and Monitor (EDM). COBIT 5</b> EDM04 Ensure Resource Optimisation <b>Monitor, Evaluate and Assess (MEA). COBIT 5</b> MEA01 Monitor, Evaluate and Assess Performance and Conformance Law of the Republic of Indonesia Number 11, 2008 on Information and Electronic Transactions. No.41/PER/MEN.KOMINFO/11/2007 Regulation of the Minister of Information and Communication General Guidelines Governing National Information & Communication Technology General Guidelines Governing National Information & Communication Technology, Edition: 1, 2007 Process Governance Mechanism - Monitoring and evaluation are set to ensure their feedback on the management of ICT, in the form of achievement of expected performance. To get a description of the performance of each process of ICT use indicators of success. Indicators of success is what will be used by management or auditors, to determine whether the process of ICT has done well.
		4. Internally and independently and internally eveluation of risk control	Law of the Republic of Indonesia Number 11, 2008 on Information and Electronic Transactions. Regulation of the Minister of Information and Communication Number 4, 2016 on Information Security Management System <b>Evaluate, Direct and Monitor (EDM). COBIT 5</b> EDM04 Ensure Resource Optimisation <b>Monitor, Evaluate and Assess (MEA). COBIT 5</b> MEA01 Monitor, Evaluate and Assess Performance and Conformance

TABLE 6. RESULT OF THE COMPARISON BETWEEN MODIFIED PEGI AND PEGI

Question		SKPD	
		Count	%
Easy To Understand	PeGI	1	1,72
	Modified PeGI	48	82,76
	Equal	5	8,62
	Do not understand	5	8,62
Enables Charging	PeGI	1	1,72
	Modified PeGI	48	82,76
	Equal	6	10,3
	Do not understand	4	6,9
More Details in Outlining 5 PeGI Dimensions	PeGI	1	1,72
	Modified PeGI	49	84,48
	Equal	4	6,9
	Do not understand	5	8,62
Can Be Used To Equalizer Perception Both Assessor and Respondent	PeGI	1	1,72
	Modified PeGI	48	82,76
	Equal	5	8,62
	Do not understand	5	8,62

From the results of the assessment ranking process, the 29 SKPD of Surabaya City got 2.53 average on 5 dimensions or categorized as GOOD, with each dimensions average are: Policy Dimension 2,65 category GOOD; Institutional Dimension 2,2 category LESS; Infrastructure Dimension 2,54 category GOOD; Application Dimension 2,41 category LESS; and Planning Dimension 2,44 category LESS. In addition, the 30 SKPD of Ambon City got 2.17 average on 5 dimensions or category LESS, and each dimensions average are listed as follows: Policy Dimension 2,57 category GOOD; Institutional Dimension 1,79 category LESS; Infrastructure Dimension 2,1 category LESS; Application Dimension 1,7 category LESS; and Planning Dimension 2,7 category GOOD.

#### IV. CONCLUSION AND DISSCUSION

From those results we can conclude that: the results obtained from Modified PeGI is more accurate, it can be seen from the questions which are more detail in the 5 PeGI Dimensions, modified PeGI got 75,86% and for the questions that are related to more appropriate devices that can be used to equalize the assessor and respondent, modified PeGI got 77,59%. Using the modified PeGI, the average rank for Surabaya is 2.53 or categorized as GOOD, while using the PeGI ratings at District Level in East Java in 2015, Surabaya got average 3.63 or category Very Good. Again this was due

to the more detail level that was applied in modified PeGI. The analogy for this process is like when we are trying to judge a house, whether it is a good house or not. When the parameters are detail enough, the value of judgement would be more objective because then we included also a process of evaluation of each features in that house, such as the doors, the kitchen, the windows etc.

There are some factors that cause the differences in the results of using PeGI and modified PeGI: the assessment process for the ranking in this research is done by implementing modified PeGI with detailed assessment indicator for depth measurement.

In ranking for district/city level in Surabaya, PeGI system also included all task-force units SKPD in city of Surabaya. In this research the ranking was only done in each SKPD that gives different result caused by well implemented e-government and better infra-structure in particular SKPD. Generally SKPD still relies on the service from Communication and Information Department that impact the average score.

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