

Analysis of the Readiness of e-Government Implementation at the Ministerial Level of the Republic of Indonesia

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ABSTRACT

Implementation of e-Government is a form of change that is in developing countries, due to the growing development of information and the rapid advancement of ICT. This kind of change is expected to be good as it is highly desirable within the community. The President as a fiduciary issued Presidential Instruction Number 3 of 2003 concerning the National Policy and Strategy Development of e-Government to all agencies throughout the Indonesian government. These agencies were required to immediately implement e-Government to improve their efficiency, effectiveness, transparency and accountability in governance. This study analyzed the readiness factors in implementing e-Government at the Ministry level in Indonesia through indicators assessed by experts as persons who know about e-Government. This study classified the indicators based on the dimensions of the dimension technology, organizational dimension, dimension environment, and dimension people (user or human resources (HR)). Tests were conducted by questionnaire using factors agreed by four experts who understand the field of e-Government. Afterwards, the analysis was performed using Fleiss Kappa i.e. assess and measure the level of expert agreement on the indicators proposed. Having obtained an agreed factor, then the authors examined and measured the factors of four Ministries. A total of 100 respondents completed the distributed questionnaires. Data processing was undertaken for evaluation testing using the Analytical Hierarchy Process (AHP). Finally, the value of each indicator was obtained for each Ministry.

Keywords: Factor Readiness, e-Government, Fleiss Kappa, Measurement Agreement, Analytical Hierarchy Process, the Ministry of the Republic of Indonesia.

1. Introduction

Indonesia has been categorized as a developing country over the past decade and is also recognized as having the largest number of Internet users in the world. The Development of Information and Communication Technology (ICT) has brought new hope for the Indonesian government to implement e-Government so as to provide better public service [1].

Based on local regulations, the implementation of e-Government might be different in each individual country. Several conditions such as culture, political views, and economic growth also encourage the development of e-Government. The other factor that also has a huge impact for improvement is people readiness, which refers not only to people in the government but also the citizens as the users.

Nowadays, 53.6 % of the Indonesian government agencies including the ministries are using websites to provide information which is accessible to the public [2]. Employing websites has several advantages such as cost effectiveness, quick response, and ease of access (transparency). Meanwhile, the use of e-Government in Indonesia still requires much improvement in terms of how to evaluate the program. By using this evaluation, the government can improve their readiness to provide public service to become a good example of e-government.

This study aimed to determine the indicators to measure e-Government implementation readiness at the Ministerial level of the Republic of Indonesia (Ministry of Agriculture, Ministry of Finance, Ministry of Home Affairs, and Ministry of Religious Affairs). E-Government readiness is defined by multiple factors defining the overall characteristics of an environment which support sustainable e-Government implementation [3]. In this research, the evaluation of readiness factors in implementing e-Government in the various Ministries in Indonesia is achieved through indicators assessed by four experts as persons who are concerned and knowledgeable of e-Government. Previous research has been performed which focused only on the Ministry of Religious Affairs of the Republic of Indonesia [4]. There are other related researches on e-Government readiness implementation for example in Malawi [5] and other developing countries [6].

This study classified the indicators based on dimensions which include dimension technology, organizational dimension, dimension environment, and dimension people (User or HR). Tests were conducted by questionnaire included factors that were evaluated by four experts who understand the field of e-Government. Afterwards, the analysis was performed using Fleiss Kappa i.e. to assess and measure the level of expert agreement on the indicators proposed [7] [8]. Having obtained agreed factors then the authors examined and measured the factors within the four Ministries. A total of 100 respondents completed the questionnaires distributed. Data processing for evaluation testing used the Analytical Hierarchy Process [9]. As the final stage, the authors obtained the value of each indicator for each Ministry.

2. Methodology

The research steps were as follows:

- 1) Formulating the Problem
- 2) Literature Study
- 3) Develop Research Framework Model
- 4) Develop Component Indicator Model
- 5) Verification of Component Indicator Model
- 6) Component Analysis with Fleiss Kappa
- 7) Testing the Model at the Ministries
- 8) Data Processing and Analysis with an Analytical Hierarchy Process
- 9) Conclusions and Recommendations

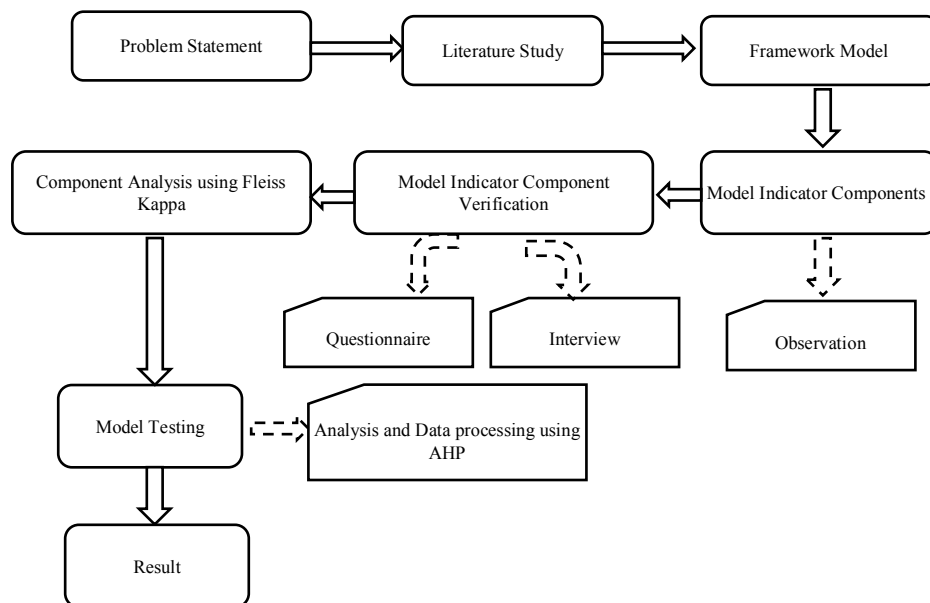


Figure 1. Research Methodology

Figure 1 shows the research methodology. Expert Choice software has been used to analyse and process the AHP, whereas Excel spreadsheet tool is simply used to calculate the Fleiss Kappa.

3. Results And Discussion

This study classified indicators based on the dimensions, namely the dimensions of technology, organisational, environment, and people (User or HR). Tests conducted by questionnaire were first supplied to four experts who understand the field of e-Government to evaluate the factors. Analysis of the responses from the experts was accomplished using Fleiss Kappa i.e. to assess and measure the level of expert agreement on the proposed indicators. Having obtained agreed factors then the authors examined the factors by passing questionnaires to the staff of the Ministries. Four Ministries were measured as part of the test. A total of 100 respondents filled out the questionnaires distributed. Subsequently, data processing for evaluation testing was undertaken using the Analytical Hierarchy Process. Finally, the value of each indicator for each Ministry was obtained.

The components of the questionnaires were assessed by the four e-Government experts (two practitioners and two professionals). The data collection component testing was performed by an informal interview. Informal interviews are intended to better understand the reasons of the experts when providing the answers. After the experts examined the questionnaires, the data was processed by measuring the level of agreement using Kappa Fleiss. The objective of the test was to determine how high was the level of approval of the experts of the components of the proposed factors. The result of the calculation of Kappa is depicted on Table 1.

The result of the Fleiss Kappa examination was to determine the factors to be used in measuring the readiness of e-Government amongst the Ministries. These factors were taken based on the final result kappa then the kappa values were compared with the value of the

Table 1. Fleiss Kappa Calculation

Category	Factor	p.1	p.2
Technology	Collaboration and Integration	0	4
		0	4
	Security and Privacy	0	4
		0	4
	Disaster Recovery	1	3
		0	4
Organization	Vision, mission and organization strategy	0	4
		0	4
	Top Management Support	0	4
		0	4
	Employment training	0	4
		0	4
	Budget and Time	0	4
		0	4
	Regulation and Policy	0	4
		0	4
	Documentation	2	2
		0	4
Environment	Economy	3	1
		3	1
	Social and Culture	0	4
		0	4
	Awareness	0	4
		1	3
People	Staff capability using Technology	0	4
	Technical Staff	0	4
Total	26	0.096154	0.903846

Table 2. Fleiss Kappa Result

Remark	Value
Po (observed proportion)	0.897436
Pe (expected proportion)	0.826183
Kappa	0.409929

interpretation that had been determined by Landis and Koch [10]. The results in Table 1 show the values obtained kappa 0.41 to reach the interpretation of Moderate Agreement or the level of agreement which is in the middle. However, considering the input from all the experts, it was suggested that an economic factor in the environment category is not a factor that can measure the readiness of the implementation of e-Government and does not have a direct impact on a ministry. The factor is not used in the measurement of readiness. This is because the value of the deal is not a dominant factor and the experts did not approve the use of such a factor. After this change, the final model for this study was obtained.

This research distributed 132 questionnaires in total to the Information Technology Divisions of the Ministries, but only 100 questionnaires were returned. In detail, the Ministry of Religious Affairs returned 20 questionnaires with missing values on as many as three questionnaires. The

Table 3. Result Model After Measurement

Dimension	Indicator
Technology	Collaboration and Integrated System
	Security and Privacy
	Information Technology Infrastructure
	Disaster Recovery
Organization	Vision, Mission and Strategy
	Top Management Support
	Employment Training
	Budget and Time
	Regulation and Policy
	Documentation
Environment	Social and Culture
	Legality
	Awareness
People (User or HR)	Staff capability using technology
	Technical Staff

Table 4. Ministry of Religious Affairs AHP Result

Category	Factor	Factor value	Category value
Technology	Collaboration and Integration	0.060	0.357
	Security and Privacy	0.103	
	Information Technology Infrastructure	0.117	
	Disaster Recovery	0.077	
Organisation	Vision, mission and organisation strategy	0.040	0.405
	Top Management Support	0.042	
	Employment training	0.051	
	Budget and Time	0.059	
	Regulation and Policy	0.110	
	Documentation	0.103	
Environment	Social Culture	0.022	0.134
	Awareness	0.051	
	Legality	0.061	
People	Staff capability using Technology	0.045	0.106
	Technical Staff	0.061	
Inconsistency		0.04	

Ministry of Home Affairs counted 33 questionnaires returned with three questionnaires missing values. The Ministry of Agriculture questionnaires were returned with 22 questionnaires, with one questionnaire missing values. About 25 questionnaires were returned by the Ministry of Finance with no missing values.

After preparing the component measures, the survey was created by using AHP. The questionnaires were distributed to the four ministries, the responses were collected and the results of the readiness of each ministry was analyzed. Table 4 gives the AHP result for the Ministry of Religious Affairs. It shows that the inconsistency value is 0.04, which means that the value is accepted without having to repeat the comparison. From the results of this table it can be concluded that the Information Technology Infrastructure indicator has the highest value with a weight of 0.117 followed by the Regulation and Policy indicator with a weight of 0.110. The smallest value is 0.022 for the Social Culture indicator. From the results, it is concluded that the infrastructure at the Ministry of Religious Affairs is better than the other indicators, but the indicator for social culture is very low. This suggests that the change in conditions from the traditional system to the online approach is deemed not socialized properly for the public by the Ministry of Religious Affairs.

Table 5 gives the AHP result for the Ministry of Home Affairs. It shows that the inconsistency value is 0.02, which means that the value is accepted without having to repeat the comparison. From the results of this table it can be concluded that the Information Technology Infrastructure

Table 5. Ministry of Home Affairs AHP Result

Category	Factor	Factor value	Category value
Technology	Collaboration and Integration	0.095	0.362
	Security and Privacy	0.090	
	Information Technology Infrastructure	0.144	
	Disaster Recovery	0.033	
Organisation	Vision, mission and organisation strategy	0.063	0.338
	Top Management Support	0.105	
	Employment training	0.061	
	Budget and Time	0.041	
	Regulation and Policy	0.044	
	Documentation	0.024	
Environment	Social Culture	0.026	0.179
	Awareness	0.083	
	Legality	0.070	
People	Staff capability using Technology	0.098	0.121
	Technical Staff	0.023	
Inconsistency		0.02	

Table 6. Ministry of Finance AHP Result

Category	Factor	Factor value	Category value
Technology	Collaboration and Integration	0.061	0.267
	Security and Privacy	0.068	
	Information Technology Infrastructure	0.081	
	Disaster Recovery	0.057	
Organization	Vision, mission and organization strategy	0.067	0.373
	Top Management Support	0.057	
	Employment training	0.078	
	Budget and Time	0.058	
	Regulation and Policy	0.064	
	Documentation	0.049	
Environment	Social Culture	0.079	0.22
	Awareness	0.069	
	Legality	0.072	
People	Staff capability using Technology	0.078	0.141
	Technical Staff	0.063	
Inconsistency		0.01	

indicator has the highest value with a weight of 0.144 followed by the Top Support Management indicator with a weight of 0.105. The smallest value is 0.023 for the Technical Staff indicator. From the results, it is concluded that the infrastructure at the Ministry of Home Affairs is better than the other indicators, but the indicator for technical staff is very low. This shows that the Ministry of Home Affairs does not have enough technical staff with sufficient skill to operate and implement an online system.

Table 6 depicts the AHP result for the Ministry of Finance Affairs. It shows that the inconsistency value is 0.01, which means that the value is accepted without having to repeat the comparison. From the results of this table it can be concluded that the Information Technology Infrastructure indicator has the highest value with a weight of 0.081 followed by the Social Culture indicator with a weight of 0.079. The smallest value is 0.049 for the Documentation indicator. From the results, it is concluded that the infrastructure at the Ministry of Home Affairs is better than the other indicators, but the indicator for documentation is very low. This shows that the constraints and problems have not been well documented in the Ministry of Finance.

Table 7 displays the AHP result for the Ministry of Agriculture. It shows that the inconsistency value is 0.01, which means that the value is accepted without having to repeat the comparison. From the results of this table it can be concluded that the Staff Capability using the Technology indicator has the highest value with a weight of 0.100 followed by the Information Technology Infrastructure indicator with a weight of 0.095. The smallest value is 0.032 for the Social Culture indicator. From the results, it is concluded that the infrastructure at the Ministry of

Table 7. Ministry of Agriculture AHP Result

Category	Factor	Factor value	Category value
Technology	Collaboration and Integration	0.056	0.253
	Security and Privacy	0.064	
	Information Technology Infrastructure	0.095	
	Disaster Recovery	0.038	
Organization	Vision, mission and organization strategy	0.069	0.407
	Top Management Support	0.081	
	Employment training	0.052	
	Budget and Time	0.064	
	Regulation and Policy	0.086	
	Documentation	0.055	
Environment	Social Culture	0.032	0.169
	Awareness	0.077	
	Legality	0.060	
People	Staff capability using Technology	0.100	0.171
	Technical Staff	0.071	
Inconsistency		0.01	

Agriculture is better than the other indicators, but the indicator for social culture is very low. This shows that the constraints and problems have not been well documented in the Ministry of Agriculture and suggests that the change in conditions from the traditional system to the online approach is deemed not socialized properly for the public by the Ministry of Agriculture.

Subsequently, the next step after collecting the comparison values using AHP as generated for the respective ministries was to perform sequencing to determine the grade of each ministry. It was found that there was no elimination standard for the ranking method. Therefore, sequencing was performed by rating the value of each indicator into four levels. The highest level (score) was 4 followed by 3 as the second level, 2 as the third level, while 1 was the lowest score.

Then, the rating values were summed as the final score. The ministry with the highest score from the AHP indicators was the Ministry of Agriculture, followed by the Ministry of Finance, Ministry of Internal Affairs, and Ministry of Religious Affairs as the lowest score. From the above results, it can be said that the indicators were necessary to monitor the readiness of implementation of e Government in the Ministries.

The following description of the results of the measurement indicators of e-government implementation readiness of the Ministries in Indonesia is proposed:

a. Ministry of Agriculture

The Ministry of Agriculture has a high score in the final assessment compared to the other three

ministries. However, some indicators also have drawbacks such as the results of discussions with department heads of the Information Centre at the Ministry of Agriculture, who state that there is a weakness in terms of legality as the Law on Electronic Transaction is not supported in the implementation of e-government which they wish to apply. It is seen that the indicator of the legality of the Ministry of Agriculture received the lowest level score.

The Ministry of Agriculture also recognized that the implementation of a collaborative and integrated system has not been completely worked out, which is also signifies by the low score the Ministry of Agriculture received in comparison to other scores. Therefore, it suggests the need to further improve the course of the implementation of e-government at the Ministry of Agriculture.

b. The Ministry of Finance

The Ministry of Finance (in this case the Directorate General of Taxation) obtained the second-best score after the Ministry of Agriculture. Almost all values scored equally well on every indicator. However, in the category of Technology, especially for the indicators of Security & Privacy, and Information Technology Infrastructure, the final value of this weighting had the lowest score among the other Ministries. The Security & Privacy and Information Technology Infrastructure requires greater improvement to support the implementation of e-government at the Ministry of Finance.

c. Ministry of Home Affairs

The Ministry of Home Affairs, in this regard the Directorate of Management Information Population Administration (Direktorat Pengelolaan Informasi Administrasi Kependudukan), obtained the third place within the final scoring. Some indicator values received the lowest position compared to other Ministries. Such changes must be made primarily on the indicators for Disaster Recovery, Budget and Time, Regulation and Policy, Documentation, and Technical Staff.

d. Ministry of Religious Affairs

Of the four Ministries, the Ministry of Religious Affairs ranked fourth on the implementation of e-government. Many indicator values are at the lower order of the Ministry compared to the other Ministries, especially regarding the Vision, Mission and Strategy, Top Management Support, Employee Training, Social Culture, Awareness, and Technical Staff. The Ministry of Religious Affairs, especially the Hajj Information Systems (Sistem Informasi dan Komputerisasi Haji Terpadu - SISKOHAT) should improve some indicators to better implement e-Government.

4. Conclusions

This research has proposed a set of measurement indicators of e-Government implementation readiness using Fleiss Kappa in which each component was arranged as a model. The component indicators were assessed by e-Government experts and a questionnaire was developed using AHP. The indicator categories were determined based on the literature and Indonesian circumstances.

Previous research discovered that organizations, technology as well as the environment and human resources are the factors that are commonly investigated. However, some investigations claim that environment and people (User or Human Resources) are the most influential factors.

Thus, the factors which have been adopted in this research are organization, technology, environment, and people (Users or HR).

Analysis of the factors was performed using Fleiss Kappa to assess and measure the level of expert agreement on the proposed indicators. The result of the model in this study is 0.41. The proposed indicators have been selected which comprise of 15 indicators to be used as the model to measure the preparedness and the readiness of the ministries for the application of e-Government. Furthermore, the main categories which were chosen in this research such as technology, organization, environment (environment), people (User or HR) were also classified into several indicators as part of the model.

As for the main categories, technology was divided into several indicators such as Collaboration and Integrated Systems, Security and Privacy, Technology of Infrastructure and Disaster Recovery System. The other category is Organization such as Vision, Mission as well as Strategy of the organization, Support from the top management, Employee Training, Funding and Timing (Budget and Time), Regulations and Policies, and Documentation. The last category was Environment which was divided into Social Culture, Legality and Awareness. Once the model had been determined, then the study continued with the model testing at the Ministries using existing methods as a Decision Support System.

The Decision Support System using an AHP questionnaire was distributed within the Information Technology Division of the Ministry of Agriculture, Ministry of Finance, Ministry of Home Affairs, and the Ministry of Religious Affairs. The data was then processed using software expert assistance. It is hoped that the results of this study will prompt the Ministries concerned to improve their preparedness to implement an integrated e-Government system in the near future. Further research is needed in the determination and selection for the proposed model which may use different methods in analysing and selecting of the sample size and respondents to obtain a better result.

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