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Computer & Network Equipment Management System (CNEMAS) Application Measurement

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ABSTRACTS

PT. ABC is one of the state-owned enterprises in Indonesia. PT. ABC has policy to give some equipment for employees to rent. Application use to control all equipment that rent by employee named as CNEMAS (Computer & Network Equipment Management System Nasional). There are some problems faced by PT. ABC in using CNEMAS, such as accuracy and its roles at PT. ABC business process. Objective of this research is to measure maturity of CNEMAS. Method used in this research are structured approach method as analysis method and Information Technology Assurance Framework (ITAF) used as measurement method. Tools such as Flowcharts, Context Diagram and Data Flow Diagram used to describe the process in CNEMAS. The result of this research are gap found at AC2 (awareness and Communication Component) where the gap is 0.71. The conclusion is CNEMAS needs improvement in accuracy, equipment location, on time report production, and consistency.

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I. INTRODUCTION

PT. ABC is a State-Owned Enterprise (BUMN) which is engaged in information and communication technology (ICT) services and telecommunications networks in Indonesia. In an effort to transform into a digital telecommunication company, PT. ABC Group certainly has divisions to implement business strategies and operations of customer-oriented companies. One division that affects the business process of PT. ABC is an IT Division that has responsibility as an information provider, and as a center for the development of Information Technology (IT).

In the IT Division at PT. ABC is broken down again into sub-divisions that have different responsibilities, one of which is a small sub-division namely Digital Work Place (DWP) at PT. ABC WITEL (Persero) Bandung Lembong branch. DWP itself has responsibility in providing equipment both computer and non-computer ordered from PT.PINS (a subsidiary of PT. ABC) which will later be used by employees of PT. ABC. In the internal business processes that exist in the DWP currently supported by IT in the form of computer infrastructure, servers, and networks, application systems, and databases that refer to the center of PT. ABC in Jakarta. The DWP section aims to control all equipment used so that when the contract period of the equipment is discharged the equipment must be appropriate.

There are some research had done to audit applications. (Z. Rezaee et al., 2001) has observed that by the time the e-commerce technologies and Internet were adopted by organizations, there had been some changes in business practices and the process of storing and

processing business transactions. Therefore, the auditors need to perform audits continuously, to ensure that the applications performed as expected and to conduct internal controls. (Abu Musa et al., 2004) stated that the audit of e-business had been a challenge for external auditors. Then, (Junaid M. Shaikh et al., 2005) also discussed that by the time an organization's business relies on information technology, the auditors should apply electronic auditing (EA) framework associated with the technologies adopted. EA implementation is part of the computer-assisted auditing techniques (CAATs).

CNEMAS (Computer & Network Equipment Management System Nasional) is one of the applications to support the DWP part work process in controlling equipment that is leased to employees of PT. ABC Indonesia in order to achieve success and goals for the construction of PT. ABC Indonesia. Based on the results of the interview regarding CNEMAS, there are some obstacles in the work process that are in the DWP. Problem face are PT. ABC cannot reach 100% equipment return, monitoring cannot be updated automatically, the DWP does not know yet maturity level of the application and the gap and human error in the use of equipment unidentified yet. The cause of the problem is not yet known in detail by the DWP, thus inhibiting the purpose of making CNEMAS. So, the DWP is still experiencing problems in information technology governance and making appropriate policy recommendations in the future development of the CNEMAS Application. Because this will greatly affect DWP business process performance. Based on these problems, CNEMAS Application needs to be measured. As the solution offered here

is audit CNEMAS using ITAF which is one method that can be used to audit applications effectively. In this study, it only focuses on how CNEMAS controls the devices that are leased to employees of PT. ABC as well as knowing the maturity level and the CNEMAS gap which later will be seen whether CNEMAS is in line with what has not been expected with PT. ABC.

Research method used is a descriptive approach, then the data collection method used is observation, interview and questionnaire. Then the system approach method used is a structured approach. The purpose of the research is to know the maturity level and the CNEMAS gap, which later would show whether CNEMAS was in accordance with what expected by PT. ABC.

2. LITERATURE REVIEW

There are several methods are used in this research. Information Technology Assurance Framework (ITAF) is used as framework to measure maturity level of Cnemas Application. Structures approach was used to analyze the application.

2.1 ITAF

Method used in this research is Information Technology Assurance Framework (ITAF). ITAF is a comprehensive and good-practice-setting reference model that:

1. Establishes standards that address IS audit and assurance professional roles and responsibilities; knowledge and skills; and diligence, conduct and reporting requirements.
2. Defines terms and concepts specific to IS assurance.
3. Provides guidance and tools and techniques on the planning,

design, conduct and reporting of IS audit and assurance assignments

2.2 Structured Approach

Structured Systems Analysis and Design Method (SSADM), originally released as *methodology*, is a systems approach to the analysis and design of information systems. SSADM was produced for the Central Computer and Telecommunications Agency, a UK government office concerned with the use of technology in government, from 1980 onwards (Mike et al., 1999).

The Structured development approach includes structured analysis and structured design. Structured analysis focuses on identifying facts of the system and limitations of the system in order to find out new system requirements. It focuses on what are the features and facilities that the new system requirements (Sajja et al., 2017).

2.3 Information Technology Maturity Level

Information Technology Maturity refers to an organization's capability to utilize its existing IT infrastructure to obtain business value (Lin et al., 2013).

Maturity assessment involves scoring the organization against defined criteria and a ranking scheme. This assessment is generally organized in ascending steps with strategies on how to move up the maturity scale. Scales are often defined in a 1-5 range that indicates increasing levels of maturity (Lin et al., 2013; Curley et al., 2016).

According to Nunnally & Bernstein Measurement can be defined as a process

of giving numbers or labels to attributes with standardized rules or agreed upon to represent measured attributes (Nunnally et al., 1994). According to Mardapi Measurement is basically the activity of determining the number of an object systematically (Mardapi et al., 2004). According to Djemari Mardapi Assessment is the activity of interpreting or describing the results of measurements (Mardapi et al., 2004). According to the ISACA Literature Module measurement is a value both large and small to assess the maturity of an object under study and for the standard it has been determined for each existing domain, to measure results is done by adding the score of each respondent's answer later. will be divided based on the number of respondents (ISACA et al., 1969).

According to the ISACA Literature Module the level of maturity is a process of assisting in defining understanding, for the maturity level there are 6 levels of maturity, level 0 which means no process, the second is level 1 where IT process has done but has no procedure, the third is level 2 where organization already done the IT process but it hasn't been implemented yet, then the fourth is level 3 where organization has already done the IT process and the implementation is still there, then the fifth is level 4 where the IT process has been done and already has the procedure and implementation fixed, and the last level 5 is perfect (ISACA et al., 1969)

3. RESULTS

The research method is a series of activities that provide an overview of the steps in conducting a particular research. The research method used by the current writer is the method of descriptive analysis giving a systematic description of the collection of facts on an object of research using certain data collection methods. The method of gathering data that I use is by conducting observation interviews and questionnaires as a method of collecting primary data and documentation as one of the secondary data collection methods. The ecosystem approach method used by the authors in this study is a structured approach using analytical tools such as flowcharts.

Research Objective

The purpose of the research design is to know the maturity level and the CNEMAS gap, which later will show whether CNEMAS is in line with what has been desired by PT. ABC.

Overview of the Running System

Running system describe using Flowchart that shown by Fig. 1 and data flow inside the system shows at data flow diagram at Fig. 2.

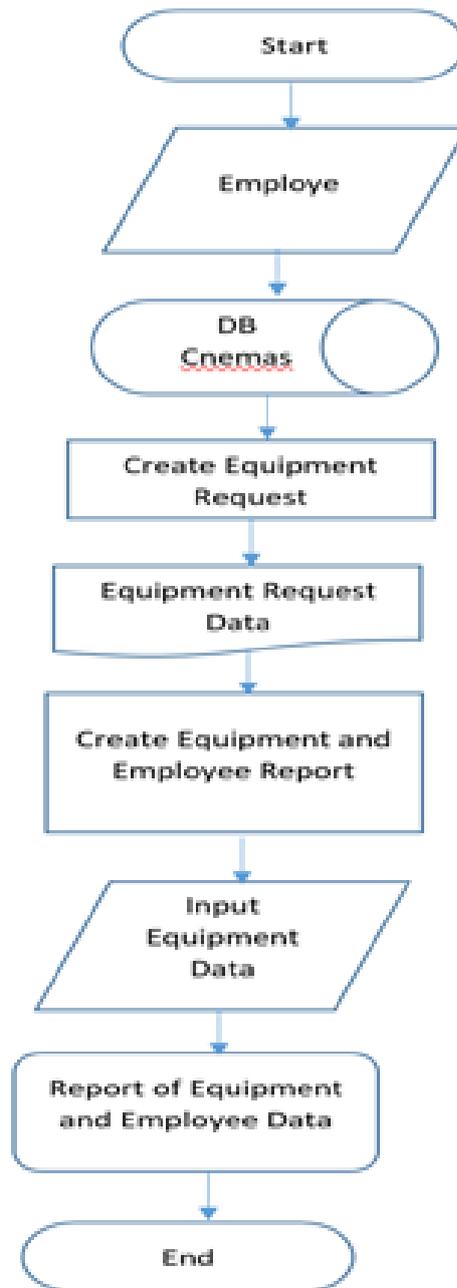


Fig. 1. Flowchart of Running System

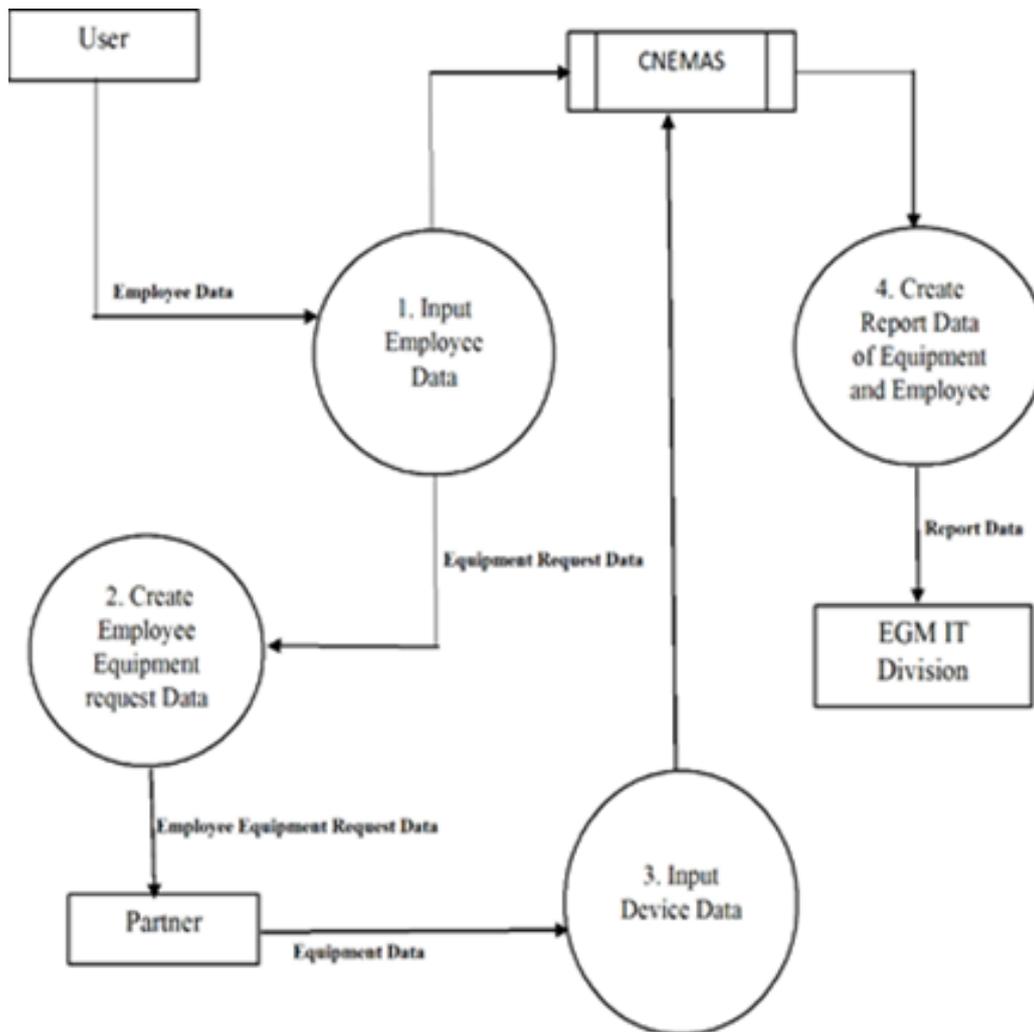


Fig. 2. Data Flow Diagram

Procedure of CNEMAS Application shown at Fig. 1 in flowchart form and the steps are describe below:

1. User sending employee data to Human Resource Department (HRD)
2. HRD entering data to CNEMAS application.
3. DWP then create equipment request data to PT. PINS
4. PT. PINS sending equipment data to DWP, then DWP entering equipment data to CNEMAS.
5. IT Division create report base on employee data and equipment data and distribute it to EGM DWP .

Measurement that had done focus on the process of planning and aligning CNEMAS application with company objectives, including control issues, tactics and identification of how CNEMAS can contribute maximally to achievement objectives of CNEMAS application.

Base on the aim of research Application Control (AC) Domain is the correct domain to measure CNEMAS Application.

Below are sub of Application Control (AC) domain:

1. AC1 - Preparation and authorization of data sources
2. AC2 - Collection and entry of data sources

3. AC3 – Examination of accuracy, completeness and authenticity
4. AC4 – Integrity and validation of inputted data
5. AC5 – Output, reconciliation and handling problems

The reason of using Application Control (AC) domain is because AC domain discusses how CNEMAS start to prepare data source authorization, collecting input data, accuracy, completeness and authenticity of the data, validating data and output as well as handling errors that occur at CNEMAS and other reasons namely in other domains. suitable and not carried out at CNEMAS application.

Questionnaire and Data Collection

Determination of value and maturity level using questionnaire distributed to respondents who have been determined based on responsibilities, where for parties from IT department act as IT managers and act as users of the CNEMAS system so that they have the ability to provide assessments related to implementation.

The questionnaire was designed in the format of column that can be filled with weighted values that have been set. The questions are grouped according to AC1 - AC6, and in each group the questions will involve 2 columns which will represent the current maturity value (as is) and expected maturity level (to be). Each question has 6 answer choices that indicate the level of maturity of the maturity attribute in each ITAF process. Respondents can choose one of the answers that is considered to best represent the conditions of maturity both current and expected.

The weight of the answer is adjusted to the current level of CNEMAS application maturity (maturity value)

and expected (maturity target) shown at Table 1:

Table 1. Score Weight of Answer

No	Maturity Score	Weight
1	A	0
2	B	1
3	C	2
4	D	3
5	E	4
6	F	5

Score of the calculated value of the maturity attribute will be rounded to produce the maturity level of CNEMAS. ITAF level starts from 0 (none) to 5 (optimal). Below are meaning of maturity score at ITAF:

A = 0, which means Non-Existent (There is no process in the application).

B = 1, It means Initial / Ad Hoc (Done, but there is no procedure yet).

C = 2, Meaning Repeatable But Intuitive (Done, but not fixed at the moment).

D = 3, It means Defined Process (done and fixed).

E = 4, Meaning Managed and Measureable (There are procedures, and there are standards and there is monitoring).

F = 5, Meaning Optimized (Perfect, the application runs well and the company quickly adapts to changes).

The score of answer questionnaire showing maturity index and shows the maturity level. Maturity index and maturity level shows by Tables 2 and 3.

Table 2. Maturity Level Score

Level	Maturity Index	Maturity Level
0	0 - 0.49	Non Existense (There is no IT Process)
1	0.50 - 1.49	Initial Ad Hoc (Has IT Process but does not have procedure)
2	1.50 - 2.49	Repeatable but Intuitive (Has IT Process and Procedure but Inconsistent)
3	2.50 - 3.49	Defined Process (Has done IT process and procedure and Consistent)
4	3.50 - 4.49	Managed and Measurable (Implement IT process, procedure and monitoring)
5	4.50 - 5	Optimized (Perfect, IT fully implemented and organization easy to adapt with change)

1) Maturity Level Questionnaire Data Results

Table 3. Accumulation of Questionnaire Answers

Domain	Maturity Score	Maturity Target	GAP
AC 1	28	30	2
AC 2	30	35	5
AC 3	25	25	0
AC 4	50	50	0
AC 5	25	25	0
AC 6	15	15	0

Numbers on Table 3 are obtained based on the domain of maturity value and maturity target filled by the four respondents then accumulated using excel formula in general where:

- 1) Attribute Maturity Value = (Total Answer maturity value of four respondents (based on each

domain) / Number of Respondents.

- 2) Attribute Maturity Targets = (Total Answers of the four maturity targets respondents) / Number of Respondents. Then use excel formula like below to get the accumulated value.

=SUM (AC 1 R1+ AC 2 R2+ AC 3 R3 + AC 4 R4) / Respondents Number.

2) Maturity Level

Based on table 4, it can be said that the current maturity level in the AC 1 process is related to the CNEMAS application at PT. ABC, which is overall in level 5 (optimized) with the conditions that have been achieved by the tools function, has run smoothly as expected, the document components have been arranged according to existing standards, the unit has been arranged neatly along with unit identification in accordance with the expectations of PT. ABC, and the return

of documents that have not been validated have been arranged according to existing standards while the expected level of maturity is at level 5 (optimized)

where the system process has been optimized, runs well and quickly adapts to changes but there are some parts that must be corrected. From the comparison of the current maturity level with the expected one, the gap value is 0.33. This shows that CNEMAS almost reached the expectations desired by PT. ABC and needed recommendations for improvements from the maturity level gap.

Table 4. Maturity Level AC 1 - AC 6

Domain	Number of Questions	Maturity Score	Maturity Target	GAP
AC 1	6	28	30	2
Index Average		4,67	5	0,33
AC 2	7	30	35	5
Index Average		4,29	5	0,71
AC 3	5	25	25	0
Index Average		5	5	0
AC 4	10	50	50	0
Index Average		5	5	0
AC 5	6	25	25	0
Index Average		4,17	4,17	0
AC 6	3	15	15	0
Index Average		5	5	0

For AC 2 it can be said that the current maturity level in the AC 2 process is related to the CNEMAS application at PT. ABC is in total located in 4 Managed and Measureable (Conducted There is a Procedure, and standard and monitoring) which in this domain CNEMAS has determined who can access CNEMAS in

accordance with expectations, the wrong procedure for document repairs is in line with expectations of PT. ABC, if there is a data transaction or an error occurs on a failed report, it can be immediately addressed and the document is stored safely in accordance with the expectations of PT. ABC, while the expected level of

maturity is at level 5 (optimized) where the system process has been optimized, runs well and quickly adapts to changes. From the comparison of the current maturity level with the expected one, the gap value is 0.71. This shows that the achievement of the maturity level target expected by PT ABC to CNEMAS and needs improvement in terms of repairs to transactions and failed reports can be resolved quickly so that it does not take much longer.

AC3, it can be said that the current maturity level in the AC 3 process is related to the CNEMAS application at PT. ABC is on the whole level 5 (optimized) while the expected level of maturity is level 5 (optimized) where the system process has been optimized, runs well and quickly adapts to changes. From the comparison of the current maturity level with the expected one, it shows a gap value of 0. This shows that CNEMAS has achieved the desired expectations by PT. ABC and does not need recommendations for improvement from the maturity level gap but must maintain consistency.

AC 4, it can be said that the current maturity level in the AC 4 process is related to the CNEMAS application at PT. ABC is on the whole level 5 (optimized) while the expected level of maturity is level 5 (optimized) where the system process has been optimized, runs well and quickly adapts to changes. From the comparison of the current maturity level with the expected one, it shows a gap value of 0. This shows that CNEMAS has achieved the desired expectations by PT. ABC and does

not need recommendations for improvement from the maturity level gap but must maintain consistency.

It can be said that the current maturity level in the AC 5 process is related to the CNEMAS application at PT. ABC as a whole is in 4 Managed and Measurable (Performed There is a Procedure, and is standard and there is monitoring) while the expected level of maturity is at the level of 4 Managed and Measurable (Conducted Procedure, and standard and monitoring). From the comparison of the current maturity level to the expected one shows a gap value of 0. This shows that the achievement of the maturity level target expected by PT ABC to CNEMAS and does not require recommendations for improvement from the maturity level gap.

It can be said that the current maturity level in the AC 6 process is related to the CNEMAS application at PT. ABC is on the whole level 5 (optimized) while the expected level of maturity is level 5 (optimized) where the system process has been optimized, runs well and quickly adapts to changes. From the comparison of the current maturity level with the expected one, it shows a gap value of 0. This shows that CNEMAS has achieved the desired expectations by PT. ABC and does not need recommendations for improvement from the maturity level gap but must maintain consistency.

3) Recommendation

Table 3 showing Recommendation base on measurement result of CNEMAS application:

Tabel 5. Recommendation

Domain	<i>Maturity Level Now</i>	<i>Maturity Level hope</i>	Recommendation
AC	<i>4 Managed and Measureabel</i>	<i>5 Optimized</i>	Overall, CNEMAS almost reached expectations, but PT. ABC still has to improve the performance of CNEMAS on the accuracy of device location and the timeliness in making reports to be more effective and must maintain consistency so that the performance of CNEMAS is not far from the expectations desired by PT. ABC.

4. CONCLUSION

Based on the results of the questionnaire PT. ABC can find out the value of maturity and maturity targets of CNEMAS but there are still a few problems in some of its domains in CNEMAS's performance which are the scope of research. These problems include the following:

1. The current maturity level in the AC 1 process is related to the CNEMAS application at PT. ABC, which is overall in level 5 (optimized), but there are some achievements that are not in line with expectations while the expected level of maturity is at level 5 (optimized) where the system process has been optimized, runs well and quickly adapts to changes. From the comparison of the current maturity level with the expected one, the gap value is 0.33. This shows that CNEMAS almost reached the expectations desired by PT. ABC and needed recommendations for improvements from the maturity level gap.

2. The current maturity level in the AC 2 process is related to the CNEMAS application at PT. ABC as a whole is in 4 Managed and Measureable (Performed There is a Procedure, and standard and there is monitoring) but there are some achievements that are not in line with expectations while the expected level of maturity is at level 5 (optimized) where the system process is optimized and quickly adapt to change. From the comparison of the current maturity level with the expected one, the gap value is 0.71. This shows that the maturity level target that PT ABC has not yet achieved in CNEMAS and needs recommendations for improvement is the maturity level gap.

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