Journal of Information Systems and Informatics
Vol. 5, No. 4, December 2023 e-ISSN: 2656-4882 p-ISSN: 2656-5935
DOI: 10.51519/journalisi.v5i4.582 Published By DRPM-UBD

Assessing Cimenyan Village's IT Readiness for Digital Transformation in West Java

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Abstract

Digital Village Development has become an important agenda in efforts to modernize and improve the quality of life in rural areas. This transformation relies on the use of information and communication technology (ICT) to increase convenience and efficiency in various fields. The success of developing a Digital Village depends on the readiness of ICT infrastructure. The village office, which is the center for administration and services to the community, must have adequate ICT infrastructure as the main requirement for activating various digital initiatives. The research was conducted to determine the current state of readiness of Cimenyan village, Bandung Regency in implementing ICT in village government offices. The readiness level analysis is prepared based on the COBIT framework in 3 domains, namely: IT process domain PO1 (defining IT strategic plans), PO2 (determining information architecture), and PO4 (defining IT processes, IT organization, and their relationships). The results of the analysis will be mapped based on the maturity level of each domain in COBIT. The level of maturity obtained will help the Cimenyan Village government to make appropriate preparations for implementing ICT so that the goal of Cimenyan Village becoming a digital village in West Java can be achieved.

Keywords: information technology, village office readiness level, maturity level, COBIT, digital village

1. INTRODUCTION

The government uses information and communication technology (ICT) in Indonesia to innovate the development of the state apparatus through the implementation of an Electronic-Based Government System (SPBE) or E-Government, namely government administration that utilizes ICT to provide services to government agencies, state civil servants, business people, society and other parties [1]. SPBE is expected to be able to realize open, participatory, innovative, and accountable government administration, increasing collaboration between government agencies in carrying out government affairs and tasks to achieve common goals. Apart from that, it is hoped that it can improve the quality and reach of public services to the wider community and reduce the level of abuse [2].

In 2019, the Governor of West Java launched the JABAR DIGITAL SERVICE program which includes the flagship program "Digital Village", a program to empower and improve the standard of living of village communities through digital literacy, IoT, and various digital innovations [3]. Digital Village aims to create digitally independent villages in West Java to improve their people's living standards [3].

Cimenyan Village in Bandung Regency is one of the villages that has responded to the Digital Village program. Currently, various innovation plans for the use of ICT are being prepared to achieve successful implementation of the Digital Village program there.

However, the success of developing a Digital Village is very dependent on the readiness of the ICT infrastructure in the village office as the center for administration and services to the local community. Adequate ICT infrastructure is a prerequisite for enabling various digital initiatives, such as e-government, online services, and data management.

This research aims to evaluate the readiness of ICT infrastructure at the Cimenyan village office to move towards a Digital Village. This evaluation will help the Cimenyan village government and related parties to identify deficiencies and potential improvements in the current information technology infrastructure. Thus, it is hoped that the results of this evaluation can provide better guidance in the development and implementation of effective Digital Village initiatives.

2. METHODS

In line with the stated objectives, this research focuses on assessment activities related to the current condition of the Cimenyan village office in the use of information technology. To the research objectives above, several steps were prepared as follows in Figure 1.

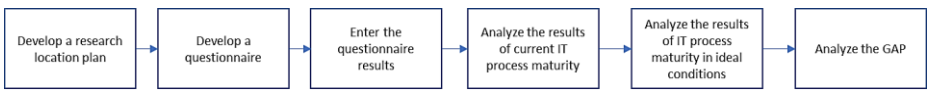

Figure 1. General Research Steps [4]

The research steps were carried out by adopting the COBIT Framework as follows.

1. Develop a research location plan that is tailored to research data needs.
2. Develop a questionnaire to assess the current conditions of the village government office which is prepared based on Cobit Domain 4.1 Domain Plan and Organize (PO) IT Process (ITGI, 2007)

3. Enter the questionnaire results into the COBIT Maturity Model tool.
4. Analyze the results of current IT process maturity.
5. Analyze the results of IT process maturity in ideal conditions.
6. Analyze the GAP between current conditions and Ideal Conditions.

An assessment was carried out on the application of information technology at the Cimenyan village office, Bandung Regency, which included business processes, use of information systems, use of information technology, and HR (IS/IT management and organization). The results of the assessment are then used to determine the design of an ideal new system proposal using information technology. The next step is to look for the 'gap' between the current conditions and the ideal conditions for implementing IT governance [5].

Assessment of the level of readiness of Cimenyan village in implementing information technology using the following domains from the COBIT 4.1 framework [7].

1. IT Plan and Organize (PO) process domain 1 about defining an IT strategic plan
2. IT Plan and Organize (PO) 2 process domains regarding determining information architecture
3. IT process domain Plan and Organize (PO) 4 about defining IT processes, organizations, and their relationships.

To be able to assess the condition of the Cimenyan village office, the research plan to assess the current condition is shown in Table 1.

Table 1. Data Collection Activities

No	Activities	Planning
1	Initial data collection a. Business processes in Cimenyan village in general b. Cimenyan village office business processes	Required documents: 1. Cimenyan village business process documents 2. Cimenyan village strategic plan document
2	c. HR and Information Technology Organizations	Required documents: 1. Cimenyan village organizational structure 2. List of employees and their duties and functions 3. Policies related to the organization and main tasks and functions of information technology 4. The existence of employees who have expertise in the field of information technology

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

No	Activities	Planning
3	d. Information technology architecture and infrastructure e. Network Infrastructure	The documents required are an inventory list of infrastructure in Cimenyan village: 1. Computer 2. Information Systems 3. Network devices 4. Server device

Data collection activities are grouped into 3 large categories, namely a description of business processes in Cimenyan village, distribution and qualifications of human resources, and architecture of computer technology and networks in Cimenyan village. The results of the processed data from the questionnaire will then be mapped to maturity levels according to COBIT provisions as in Table 2.

Table 2. Maturity Level Values in IT Processes [8]

No.	Maturity Levels	Characteristics
1.	0-Non-Existent	Complete deficiencies in any process that can be identified. The organization doesn't even know that there is a problem that needs to be addressed.
2.	1-Initial or Ad Hoc	There is evidence that the Organization is aware of problems that must be addressed. However, there is no standard process, instead using an ad hoc approach that tends to be treated individually or on a case-by-case basis. In general, the approach to process management is disorganized.
3.	2-Repeatable but Intuitive	The process is developed into stages where similar procedures are followed by different parties for the same work. There is no formal training or communication of standard procedures and responsibility is left to the individual. There is a high level of confidence in individual knowledge so the possibility of errors is very large.
4.	3-Defined	Procedures are standardized and documented and then communicated through training. It was then mandated that these processes must be followed. However, it is impossible to detect irregularities. The procedure itself is not complete but it formalizes the practice.
5.	4-Managed and Measurable	Management monitors and measures compliance with procedures and takes action if processes cannot be carried out effectively. The process is under constant improvement and provision of good practice. Automation of the device is used within certain limits.
6.	5-optimized	The processes have been selected to the level of good practice, based on continuous improvement results and from maturity modeling with other companies. It is used to automate workflows, provide tools to improve quality and effectiveness and make companies adapt quickly.

The values listed in Table 2 will be tried to be applied to the current situation in Cimenyan village, with a maturity target at level 3 (Define). This indicates that the Cimenyan village government has a strategy to move towards a digital village in West Java [6].

3. RESULTS AND DISCUSSION

Data collection is carried out based on two types of definitions, namely information technology strategic plans and information architecture. The expectation value was determined by the Cimenyan Village government, namely at the 4th maturity level [8].

3.1 Results of data collection for defining information technology (IT) strategic plans

The questionnaire used to define an IT strategic plan is prepared based on the COBIT 4.1 IT Process Domain Plan and Organize (PO) Framework 1. The answers to the questionnaire above are then entered into a tool for measuring the maturity level of the COBIT 4.1 IT Process Domain PO1 IT process-analysis results in Table 3.

Table 3. IT Process Maturity Level (Domain PO1)

Level	Compliance	Contribution	Values
0	0.67	0.00	0.00
1	0.46	0.30	0.14
2	0.08	0.70	0.06
3	0.29	1.00	0.28
4	0.22	1.30	0.29
5	0.07	1.70	0.11
IT Process Maturity Level =			0.89

The assessment results can be mapped to Figure 2, namely the position of maturity relative to the expected value.

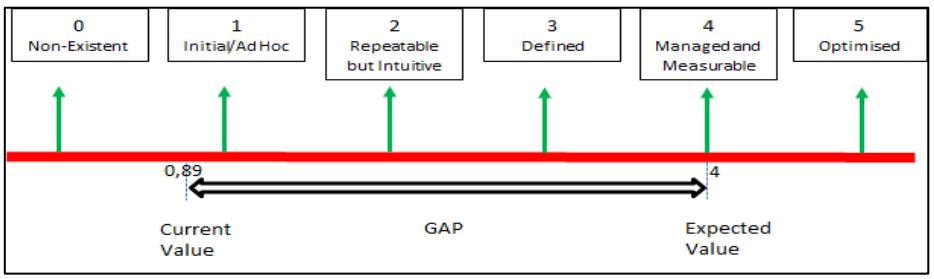

Figure 2. Current Domain PO1 IT Process Maturity Value and Expected Condition Value

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

From Table 3 and Figure 2, the maturity level for the PO1 Domain is less than 1. This means that the importance of the PO1 domain does not seem to be well defined by the Cimenyan Village [9], [10].

3.2 Results of data collection for defining Information Architecture, IT Infrastructure, and Personnel

The results of observations carried out to map the current infrastructure and personnel at the Cimenyan Village Office can be seen in Table 4.

Table 4. Owned Technology Profile

No	Questions	Total	Notes
1	Banyaknya perlengkapan komputer yang ada di kantor Desa Cimenyan		
	a. Komputer server	-	
	b. Prosesor pentium 4 atau dibawahnya	-	PC Pentium IV
	c. Prosesor di atas pentium 4	3	
	d. Laptop	4	3 Inventory, the rest is private property
	e. Alat cetak printer	2	
	f. Alat pemindai dokumen Scanner	1	
	g. Modem	-	
	h. Hub	1	
	i. Plotter	-	
	j. Jaringan nir kabel	1	
	k. UPS	1	
	l. Switch	2	
2	Lokasi bagian TI di kantor desa	In one building	
3	Penangan kerusakan/kendala	Solved by myself	Village staff graduate
4	Telah terpasangnya jaringan komuter lokal di kantor Desa	Already	
5	Telah memiliki hubungan komunikasi data dengan desa lain	-	
6	Sudah terhuungan dengan jaringan Internet	Already, limited	
7	Provider nternet yang digunakan di desa Ciemnyan	Telkomsel	Scholar's personal property village companion
8	Pemanfaatan penggunaan internet pada kantor desa	Used to fill in village profiles and wants to	

No	Questions	Total	Notes
		be developed into a library	
9	Jumlah staf yang mengerti jaringan	1	
10	Jumlah staf yang mengerti Keamanan jaringan	1	
11	Jmlah staf yang mampu mengelola sistem informasi	1	
12	Kendala pengembangan Teknologi Informasi di kantor desa	ICT Infrastructure and IT Personnel (HR)	There is only 1 ICT graduate
13	Penggunaan bersama kompter atau teknologi lain	2	

Based on infrastructure data, IT personnel, and use of information systems, IT process maturity level results for Domain PO2 can be obtained as shown in Table 5.

Table 5. IT Process Maturity Level Values (Domain PO2)

Level	Compliance	Contribution	Values
0	0.30	0.00	0.00
1	0.43	0.30	0.13
2	0.01	0.70	0.00
3	0.25	1.00	0.25
4	0.11	1.30	0.14
5	0.08	1.69	0.14
IT Process Maturity Level =			0.68

The assessment results can be mapped to Figure 3, namely the position of maturity relative to the expected value.

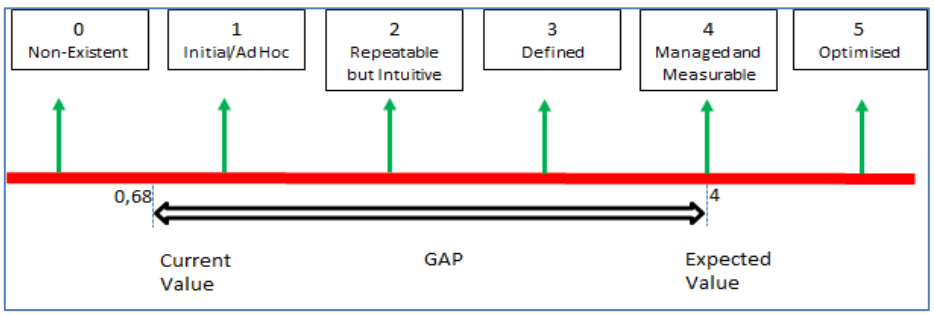

Figure 3. Current Domain PO2 IT Process Maturity Value and Expected Condition Value

From Table 5 and Figure 3, the maturity level for the PO2 Domain is still less than 1. This means that the importance of the PO2 domain does not seem to be well defined by the Cimenyan Village [11].

Furthermore, the results of the IT process maturity level in the PO4 domain regarding Organization and its relationship to the PO2 domain of the COBIT 4 Framework are shown in Table 6.

Table 6. IT Process Maturity Level (Domain PO4)

Level	Compliance	Contribution	Value
0	0.33	0.00	0.00
1	0.25	0.30	0.07
2	0.00	0.70	0.00
3	0.43	1.00	0.44
4	0.08	1.30	0.11
5	0.13	1.70	0.22
IT Process Maturity Level =			0.85

The assessment results can be mapped to Figure 4, namely the position of maturity relative to the expected value.

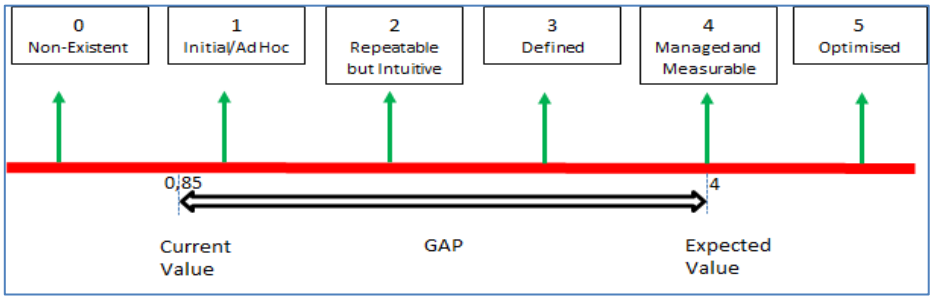

Figure 4. Current Domain PO4 IT Process Maturity Value and Expected Condition Value

From Table 6 and Figure 4, the maturity level for Domain PO4 has not yet been defined by the Cimenyan Village [12].

Based on the assessment in Figure 5, the maturity level of IT processes or the level of readiness of Cimenyan village based on the reference domain PO 1 of the COBIT framework regarding defining IT strategic plans is at a value/maturity level of 0.89, domain PO 2 regarding determining information architecture is at a value/maturity level of 0.68, and the PO4 domain regarding IT processes, IT organizations and their relationships is at a value/maturity level of 0.85.

The three IT process domains, the maturity level of the village government office can be categorized as level 1 (initial/Ad Hoc), which means there is evidence that

the Cimenyan village government is aware of the problems that must be addressed. However, in its implementation it does not use a standard process, it only uses an ad-hoc approach which tends to be handled individually or case by case. In general, the approach to process management is not well organized. Another fact that can be noted is that village government offices still have very minimal human resources and infrastructure, especially those related to Information and Communication Technology (ICT). Figure 5 shows an overview of the overall results of the ongoing condition assessment at the Cimenyan village office.

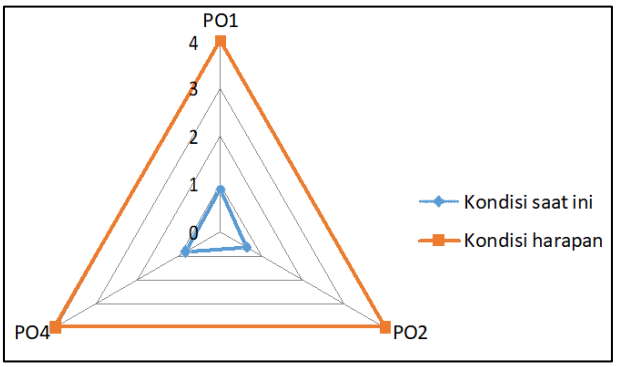

Figure 5. Graph of assessment results for all domains analyzed

4. CONCLUSION

The analysis of the technology use maturity level in Cimenyan Village, Bandung Regency, yields several significant conclusions. Firstly, the village government office's maturity level across three IT process domains is at level 1 (Initial/Ad Hoc). This suggests that while the village government is aware of several existing issues needing resolution, their approach is still in its nascent stages. Secondly, the absence of standard operational procedures in the village office is notable. Instead, there is a reliance on an ad hoc approach, where issues are addressed individually or on a case-by-case basis, indicating a lack of systematic process management.

Furthermore, the overall approach to process management in the village office is found to be unstructured and disorganized. This lack of organization is a significant barrier to achieving a higher level of technological maturity. Lastly, it is observed that in the Cimenyan village government office, both human resources and infrastructure, particularly in the realm of information and communication technology, are minimal. This scarcity of resources and expertise in the ICT domain further hampers the village's ability to effectively implement and manage technological processes. These findings underscore the need for a more structured approach and enhanced resources in the Cimenyan village office to elevate their technology use and process management to a more advanced and effective level.

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