Assessment of Village Readiness for Electronic Citizen Complaint Services (e-AduMas) Using COBIT 4.1

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Abstract

The objective of this study is to investigate the implementation of the electronic community complaint service, known as e-AduMas, in villages utilizing SMS Gateway and GSM network technologies. The research aims to evaluate both the technological readiness of village offices using COBIT 4.1 and the community's acceptance of the e-AduMas system. The study employs a comprehensive research methodology that includes the analysis of community needs, the design of the e-AduMas system, the development of an integrated SMS Gateway application with the village government platform, and field testing involving active participation from the village community. Data will be collected through surveys, interviews, and observations to assess the level of implementation success, user response, and technical feasibility. The anticipated outcomes of this research include practical guidance for other villages looking to construct similar systems to enhance citizen participation in local governance. This study is poised to make a significant contribution to the application of technology in village governance, specifically in the development and utilization of the e-AduMas service. The findings of this research are expected to provide valuable insights for strengthening citizen engagement in local governance through innovative technological solutions.

Keywords: COBIT 4.1, community complaint, e-readiness index, electronic service, SMS gateway

1. INTRODUCTION

In today's digital age, the integration of information technology into public services has become vital for meeting the evolving needs of communities. This paper examines the role of electronic community complaint services in enhancing communication between citizens and governmental bodies, a concept increasingly crucial in public administration [1]. It emphasizes the significance of participatory, transparent, and democratic approaches in village development, ensuring that all stakeholders feel a sense of ownership and responsibility in the process [2].

The study specifically addresses the Indonesian context, where the management of public complaints is mandated by the government. As per the 2016 Regulation

of the Indonesian Ministry of Village, citizens are entitled to report any governmental misconduct or misappropriation. These reports can be made through various mediums, both electronic and non-electronic, including SMS, websites, and traditional complaint boxes [3,4].

At the heart of this research is the development and analysis of e-AduMas, a system that leverages SMS Gateway and GSM network technologies in the village setting. This system is designed to facilitate the electronic submission of complaints by villagers, harnessing the power of widespread mobile device usage. The utilization of SMS Gateway allows for the efficient sending and receiving of messages, while GSM networks offer connectivity beyond geographical limitations [5].

This study aims to explore how e-AduMas can improve the transparency, responsiveness, and accountability of village governments in addressing community concerns. It investigates the integration of modern communication technologies in local governance and seeks to provide insights into the potential and challenges of implementing tech-based solutions in such environments. This research endeavors to contribute to the evolution of innovative and technology-oriented public service systems at the village level, offering a blueprint for similar technological applications in other regions [6].

2. METHODS

The research steps are comprehensively described through an overview of the resolution process that summarizes the activities over one period. The purpose of this method is to provide a comprehensive view of how this program will be executed and achieve the established objectives. Figure 1 provides an overview of the steps encompassed in this resolution overview.
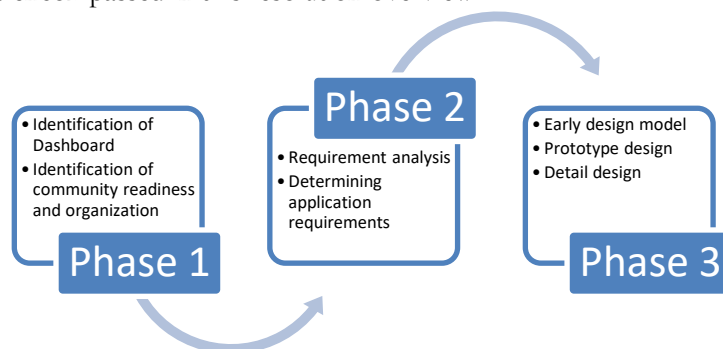
Figure 1. Research Completion Method

For this study, only phase 1 will be conducted initially, which involves identifying the readiness of the community and the village office towards the e-AduMas

technology to be implemented in the village. The subsequent stages of the research will be carried out in phase 2 and phase 3.

2.1. Feasibility Study

The first step taken in achieving this objective is the conduct of a comprehensive feasibility study. Through this study, a thorough analysis will be conducted on crucial aspects encompassing technical, financial, and social dimensions. The aim is to ensure that this endeavor is founded on solid grounds and can be executed efficiently. The feasibility study will identify potential barriers and opportunities, as well as provide a profound understanding of the anticipated benefits from the implementation of this research [7]. With the information obtained from this feasibility study, subsequent steps can be directed more accurately, ensuring the smooth progress of the research towards the desired outcomes.

2.2. Study of Literature

In order to formulate an appropriate solution, a comprehensive study of the existing dashboard models becomes crucial. The presence of various models provides an opportunity to extract information about the successes and failures of past implementations [8]. From here, we can learn from the existing experiences, identify the determinants of success, and anticipate potential difficulties that may arise in managing e-AduMas. With a profound understanding of these dynamics, more mature and targeted steps can be taken to ensure that the developed e-AduMas can be implemented effectively and efficiently.

2.3. Analysis of Development problems and needs

Analysis of issues and development needs will be a crucial step in this initiative. Through a meticulous and comprehensive approach, the research team will delve deeply into the challenges faced by the rural community and identify the needs that require attention. From here, a clear picture will emerge regarding the aspects that necessitate focus in the development process of the e-AduMas service. This analysis will encompass various dimensions, including issues possibly related to bureaucracy, information unavailability, or lack of accessibility for the community. With accurate analysis results, the subsequent steps in this service will be more directed and aligned with the real needs present in the village.

2.4. Application Design e-AduMas

Through this phase, a thorough design of the e-AduMas application, which will serve as the core of this system, is conducted. This application will be designed with a user-friendly interface to facilitate the community in submitting complaints and tracking the status of their complaints. Additionally, the development

encompasses the creation of an Information Dashboard that will provide informative visual insights for village officials and relevant parties regarding the number of complaints, common reported issues, and the success rate of resolutions. With the matured design of the e-AduMas application, it is anticipated to provide an efficient and transparent platform for the community to participate in enhancing public services in the village.

3. RESULTS AND DISCUSSION

This study employed a questionnaire-based approach, distributed to a sample population of 100 individuals, to investigate respondents' behaviors in utilizing GSM technology through mobile devices. The questionnaire encompassed various statements related to respondents' behavior in utilizing GSM technology through mobile devices.

The variables considered in formulating the statements included:

1. Type of mobile phone technology used (smartphone, 2G/4G, etc.)
2. Number of mobile phones owned within a household.
3. Utilization of mobile phones (SMS, calls, browsing, chat, email, etc.)
4. Frequency of mobile phone usage.

The survey results were categorized based on the respondents' age groups, as presented in Table 1.

Table 1. Technology User Respondents

Age Category	Total	Percentage
Pre baby boomers (< 1945)	5	2,38%
Baby boomers (1946-1964)	25	11,9%
X (1965-1980)	45	21,42%
Y/Millenial (1981-1994)	60	28,58%
Z (1995-2010)	75	35,72%
Alpha (2011-sekarang)	0	0%
Total	210	100%

Table 1 presents a breakdown of technology users by age group, highlighting the generational spread among 210 respondents. The data is categorized into six age groups, starting with 'Pre baby boomers' (born before 1945), who constitute the smallest portion of the sample at 2.38% with only 5 respondents. The 'Baby boomers' (born between 1946 and 1964) follow, comprising 11.9% of the sample with 25 respondents. The 'Generation X' cohort (born between 1965 and 1980) represents a more substantial segment at 21.42%, accounting for 45 respondents. This progression indicates an increasing trend in technology use among younger generations.

The most significant proportions are observed in the younger generations. 'Millennials' (also known as Generation Y, born between 1981 and 1994) make up 28.58% of the respondents, numbering 60 individuals. The 'Generation Z' group (born between 1995 and 2010) constitutes the largest segment, with 35.72% or 75 respondents, indicating a high engagement with technology in the most recent generations. Interestingly, the 'Generation Alpha' category (born from 2011 onwards) has no representation in this survey, with 0% participation. Overall, the table reflects a clear trend of increasing technology adoption in more recent generations, with a significant emphasis on the younger, digitally native cohorts. For the survey results based on the utilized devices, please refer to Table 2.

Table 2. Devices Used

Device	Owned	Not Owned	Total
Computers	15	195	210
Landline phones	145	65	210
Mobile phones	210	0	210
Laptops	42	168	210

Table 2 in the survey focuses on the types of devices used by the respondents, offering a clear picture of device ownership and non-ownership among 210 participants. The devices in question include computers, landline phones, mobile phones, and laptops. The data reveals significant variations in the ownership and usage patterns of these devices.

Starting with computers, only a small fraction of the respondents, about 15 individuals, own a computer, while a vast majority, 195 respondents, do not, making the total count 210. In contrast, landline phones exhibit a higher ownership rate, with 145 respondents owning a landline phone and only 65 without, summing up to the same total of 210. The most striking result is seen in the ownership of mobile phones, where all 210 respondents reported owning one, indicating ubiquitous mobile phone usage. Laptops, much like computers, are less commonly owned, with only 42 respondents having a laptop and a significant 168 not owning one. These findings reflect a strong preference for and reliance on mobile phones in this group, while computers and laptops are less prevalent. In the survey results, grouping based on the applications used on HP/Mobile phone can be observed in Table 3.

Table 3. Applications used on HP/Mobile Phone

Apps Name	Used	Not Used
SMS	210	5
Voice Call	210	0
Facebook	178	32
WhatsApp	208	2
Games/Games Online	209	1

Apps Name	Used	Not Used
Line	18	192
Instagram	19	191
Tweeter / X	30	180
Google Search	62	148

Table 3 from the survey categorizes the respondents based on their usage of various applications on HP/Mobile phones. The table lists a range of applications and shows the number of users who use these apps versus those who do not, among the survey participants.

At the top of the list are SMS and Voice Call applications, which exhibit almost universal usage. All 210 respondents use Voice Call, and 210 respondents use SMS, with a negligible 5 not using it. This high usage rate underscores the primary role of mobile phones in communication. Following these, Facebook has a significant user base, with 178 respondents using the app and 32 not using it. WhatsApp is nearly as pervasive as voice calls and SMS, with 208 users and only 2 non-users.

Games or Online Games are also widely used, with 209 respondents playing them and only 1 not engaging in gaming activities. In contrast, Line and Instagram show a markedly lower usage rate, with only 18 and 19 users respectively, and a vast majority not using these apps (192 for Line and 191 for Instagram). Twitter (labeled as Tweeter/X in the table) has a slightly higher usage with 30 users, but still a large number of non-users at 180. Google Search, used by 62 respondents, also shows less penetration among the survey participants compared to other apps, with 148 not using it.

Overall, the data from Table 3 reveals that traditional communication functions like SMS and voice calls are still dominant on mobile phones, while social media apps like Facebook and WhatsApp also have a strong user base. However, there is a notable variance in the popularity of different social media and utility apps among the respondents. For the results of the content-based clustering survey, please refer to Table 4.

Table 4. Frequently accessed content

Apps Name	Always	Not
celebrity news	207	3
Information Technology	75	135
Agriculture	102	108
Dusiness	85	125
Music and Film	205	5
Village Info	0	210
Sports	103	107
Goverment and Polotics	40	170
Village Website	16	194

Table 4 from the survey presents data on the types of content frequently accessed by respondents, categorized by the frequency of access — 'Always' versus 'Not'. This table offers insights into the interests and preferences of the survey participants regarding various content areas. The table shows that celebrity news is overwhelmingly popular, with 207 respondents always accessing it and only 3 not engaging with such content. Similarly, music and film content is also highly favored, with 205 respondents frequently accessing it, while only 5 are not. This high engagement indicates a strong preference for entertainment-related content among the surveyed individuals.

In contrast, other content areas show more varied levels of interest. Information Technology content is accessed regularly by 75 respondents but not accessed by a significant 135. Agriculture content is moderately accessed, with 102 respondents always viewing it, compared to 108 who do not. Business content has a similar trend, with 85 frequently accessing it and 125 not. Sports content is accessed regularly by 103 respondents, with 107 not showing interest in it. Content related to government and politics is less frequently accessed, with only 40 respondents always viewing it and a majority of 170 not engaging with it.

The survey also reveals that specific local content, such as village info and village websites, has extremely limited or no engagement. None of the respondent's access village info, and only 16 regularly visit village websites, with a vast majority of 194 not using it. These findings from Table 4 provide a clear picture of the content preferences among the survey participants, highlighting a strong inclination towards entertainment and celebrity news while showing lesser interest in local village information, government, and politics-related content.

Next, the subsequent step is to assess readiness using the e-readiness index concept [9]. The research yields average scores across 6 indicators: Awareness (average score of 3.62), Governance (average score of 4.20), Business Resources (average score of 3.45), Human Resources (average score of 3.86), and Technological Resources (average score of 4.10). Based on the above results, it is concluded that the community in the Village is prepared to implement the digital village program, and the presence of adoption indicators supports the realization of the digital village implementation in the Village. For future research, researchers can expand the scope beyond a single region and encompass multiple areas for comparison. The digital village program can be implemented across all regions.

In assessing the level of village readiness for implementing the ICT Masterplan at the village office, the researcher utilized the domains from the COBIT 4.1 framework as follows [10]:
   a. The TI Plan and Organise (PO) 1 process domain concerning defining the IT strategic plan.

b. The TI Plan and Organise (PO) 2 process domains concerning determining the Information architecture.
c. The TI Plan and Organise (PO) 4 process domain concerns defining IT processes, organization, and their relationships.

The use of these framework domains aims to ensure that the assessment results of the current real conditions in the village can be utilized to formulate and implement the ICT Masterplan at the village government office. In order to assess the current conditions of the village office, the research plan includes evaluating the current conditions and related data on the availability of infrastructure at the village office, which can be found in Table 5.

Table 5. Availability of Village Office infrastructure

No	Question	Total Answer	Description
1	How many computer equipment is there in the sub-district environment?		
	a. Server	-	
	b. Pentium IV atau dibawahnya	1	PC Pentium IV
	c. Diatas Pentium IV	-	
	d. Notebook	-	Milik pribadi kepala desa
	e. Printer	2	
	f. Scanner	1	
	g. Modem	-	
	h. Hub	-	
	i. Plotter	-	
	j. UPS	1	
	k. Wifi	-	
	l. Modem	-	
	m. Switch/ hub	-	
2	Location of sub-districts in sub-districts	In one building	
3	Solution if damage occurs	Solved by myself	From the village assistant scholar

No	Question	Total Answer	Description
4	Has a LAN network been installed in the sub-district?	-	
5	Is it connected to other sub-districts/villages?	-	
6	Is it connected to the Internet?	-	
7	Internet connection used in the village/sub-district	Telkomsel	The personal property of the village accompanying scholar
8	Benefits of using the internet at sub-district offices	Used to fill in village profiles and wants to be developed into a library	
9	How many staff understand networking?	1	
10	How many staff understand network security?	1	
11	How many staff are able to manage the information system	1	
12	What are the obstacles to the development of Information Technology in the Subdistrict office?	ICT Infrastructure and IT Personnel (HR)	
13	One computer is used by how many people?	3	

Figure 2 below provides an overview of the current ongoing assessment results of the village office's condition, as well as the expected condition across all COBIT domains utilized.
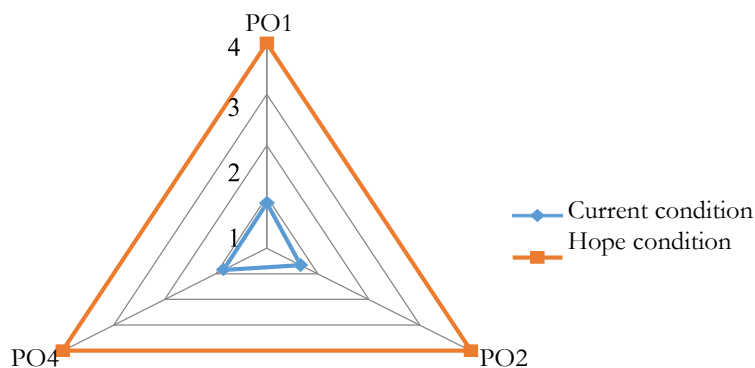
Figure 2. Graph of assessment results from all PO domains

Based on the assessment of the current condition of the village office, the level of IT process maturity or village readiness based on the reference of domain PO 1 in the COBIT framework regarding the definition of IT strategic plans is at a maturity level of 0.88. Domain PO 2 regarding determining information architecture is at a maturity level of 0.66, and domain PO4 regarding IT processes, IT organization, and its relationships are at a maturity level of 0.85. Among these three domains of IT processes, the maturity level of the village government office can be categorized at level 1 (initial/Ad Hoc), which means there is evidence that the village government is aware of existing issues that need to be addressed. However, there are no standard processes in place; rather, an ad hoc approach is used, which tends to be handled on an individual or case-by-case basis. Overall, the approach to process management is not organized. The village office still lacks human resources and infrastructure, particularly those related to Information Technology and Communication (ICT).

4. CONCLUSION

This research aimed to evaluate the preparedness of village communities for the adoption of e-AduMas, a new technological initiative. The study's findings reveal a mixed level of readiness. On one hand, the village community demonstrates a high degree of preparedness for using SMS gateway technology via GSM networks. This readiness is primarily indicated by the widespread ownership of mobile phones, with 210 users predominantly utilizing SMS services in their daily lives. Such a trend suggests that the community is already familiar with GSM network functionalities and the usage of SMS on mobile devices, which bodes well for the smooth integration and acceptance of the e-AduMas service.

On the other hand, the technological preparedness within the village government office presents a contrasting picture. The assessment, based on COBIT 4.1 standards in the PO domain, places the office at level 1. This level indicates that while the implementation of the e-AduMas service is possible, it may require additional time and effort. The village office needs to address internal challenges before successfully adopting this technology. The goal is for the village government office to overcome these hurdles and eventually implement the e-AduMas service effectively. Achieving this would ensure cohesive and efficient functioning across all involved parties, aligning community needs with technological capabilities.

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