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Influence of Mobile-Based Correspondence Information Systems on Administrative Services using SCRUM

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ABSTRAK
This study aims to design, implement, and analyze the impact of a correspondence information system on administrative services in Antiga Village, with a focus on enhancing transparency and service efficiency. A web- and mobile-based management information system was developed to support this objective. The study was structured using the SCRUM model. In Sprint 1, initial data collection was conducted through interviews and questionnaires distributed to village residents, with a carefully selected population and sample. Sprint 2 involved secondary data analysis from literature and previous studies, providing insights into best practices for village administrative management. Sprint 3 included system design using user interface mockups and process flow diagrams. Sprint 4 concentrated on system implementation and functional testing to validate its capabilities. The results indicate that this system has improved administrative service performance, with functional testing achieving a success rate of 71.43%. Impact analysis shows a positive correlation between system implementation and service improvement, with a determination coefficient of 10.3%, suggesting that additional factors also contribute to service enhancement. This study's contribution lies in its dual focus on system implementation and comprehensive impact analysis, making it a model for similar administrative contexts. The integration of Panca Satya values provides a framework that strengthens transparency, commitment, and dedication to village development. Intensive technology training was found necessary to enhance technical literacy among village officials, ensuring optimal system operation and broadening benefits such as reduced service times and increased resident satisfaction. This study offers a model for integrated service improvement and underscores the role of technology-driven transparency in advancing rural administrative management, serving as a valuable reference for similar initiatives.

1. INTRODUCTION

Transparency and speed of services in villages are important factors in increasing residents' satisfaction and accelerating administration (Mardinata et al., 2023; Sukma & Leelasantitham, 2022). The need for transparency and speed of services among village residents is very high because they require quick and efficient services to address the problems they face (Sawir, 2020; Shinohara, 2023). Transparency and speed of services can enhance village residents' satisfaction by improving efficiency, trust, and service quality (Huan et al., 2022; Li et al., 2022).

Transparency and speed of services in villages are also related to the Sustainable Development Goals (Khan et al., 1 C.E.; Niekerk, 2020; Nugroho et al., 2021). The SDGs provide important goals for achieving positive changes in various aspects of life, including improving transparency and speed of services in villages (Iskandar, 2020; Kasinathan et al., 2022). The SDGs most affected by service improvements in villages are SDG 16, which focuses on peace, justice, and strong institutions, and SDG 11, which focuses on sustainable cities and communities. By improving transparency and speed of services in villages, it can help achieve the SDGs, allowing village residents to receive better and more effective services (Permatasari et al., 2021; Ronaldo & Suryanto, 2022).

Antiga Village, one of the villages in Karangasem Regency, Bali, has a typical village apparatus structure. Consisting of 6 banjars, with an area of 8.83 square kilometers and a population of 8,957 as of 2016, Antiga Village must provide excellent services for its community. Many residents of Antiga Village, who are still registered as active residents with Antiga Village ID cards, have migrated to big cities, requiring them to manage their administration back in Antiga Village. The excellent services provided by the Antiga village apparatus are still unable to handle the large volume of administrative services that need to be addressed. Additionally, sudden requests for administrative documents and short waiting times make the administrative process rushed and less than optimal. The condition of Antiga Village as a tourist village with two vital tourist attractions and various

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official matters requires the village apparatus to occasionally conduct work visits, causing some administrative approval requirements to be delayed. The urgency of this research is the pressing need to improve administrative services in Antiga Village, the impact of transparency and speed of administrative services on residents' satisfaction, the importance of population services on the SDGs, and the progress of other villages, making research related to improving administrative services necessary (D'Andria et al., 2021; del Arco et al., 2021; Martinez-Gil et al., 2022).

Based on these issues, integrated with technology and local genius, *Panca Satya*, which consists of five loyalties: *Satya Wacana* (loyal and honest in words), *Satya Hrêdaya* (loyal to one's heart), *Satya Laksana* (honest and responsible for actions), *Satya Mitra* (loyal to friends), and *Satya Semaya* (always keeping promises), can be proposed (Natih, 2021; Sugiharto, 2023). The proposed approach is to enhance the services of the Human Resources of the Antiga village apparatus by providing a transparent integrated correspondence application, training on its use, and the impact of implementing the Correspondence Information System in Antiga Village. The innovation offered is the enhancement of security, transparency, and efficiency of correspondence that can be conducted without waiting for office service hours and without direct interaction between the community and village officials.

Several previous studies have successfully implemented various Information Systems for administrative services in villages, including web-based service systems using prototyping methods (Kurniawan et al., 2020), smart village models for administrative services (Martadala et al., 2021), the application of information and communication technology for village information publication in the globalization era (Mukhsin, 2020), and the design of village information systems using the waterfall method (Supiyandi et al., 2022). However, there remains a research gap in exploring the integration of local cultural values, such as the Panca Satya principles, into the design and functionality of these administrative systems. This gap highlights the need for a culturally grounded approach that not only aims to improve technological efficiency but also aligns with the ethical and community-based values important to rural populations.

The Correspondence Information System represents a significant innovation in the development of administrative services within the village (Na'im & Priyanto, 2023). By streamlining communication and improving efficiency, this system aims to enhance the overall quality of service delivery to residents and facilitate better management of administrative tasks (Nugraha et al., 2022). The novelty of this research lies in the integration of the Panca Satya values as a framework within the CIS, an approach that has not been adequately explored in prior studies on village information systems. This unique combination seeks to improve service transparency, accountability, and community satisfaction by embedding local values in the digital solution.

Additionally, the digitization of the correspondence system based on the Panca Satya concept can improve community services and measure its impact on service satisfaction for the community (Alhari & Fajrillah, 2022; Cāne, 2021; Yuniar & Hasanah, 2021). In conducting the measurement, quantitative data processing will be carried out from the results of questionnaires to village apparatus and the community before and after the system is implemented (Galushi & Malatji, 2022; Irawan et al., 2024; Sihombing & Lumbantobing, 2024). By addressing this research gap, the study not only contributes to the field of village administration but also offers a model for integrating cultural principles into digital service systems, thus creating a benchmark for similar rural administrative contexts.

The SCRUM model is particularly suitable for this case study as it facilitates adaptive planning (Santos et al., 2023). It also encourages a collaborative approach among stakeholders, which is essential for addressing the dynamic and diverse administrative needs of Antiga Village. By employing SCRUM, the development process allows for regular feedback loops with village officials and residents (Nyandongo & Madumo, 2022). This ensures that the final system is not only efficient but also tailored to meet the specific requirements of the community, ultimately enhancing service delivery (Tjhin et al., 2021).

The novelty of this research lies in the integration of the SCRUM model within a rural administrative context that emphasizes cultural alignment through Panca Satya values. This unique approach combines an agile development framework with traditional community values, creating a culturally relevant and highly adaptive administrative system that responds directly to the needs and expectations of the local population. For testing this system, black box testing will be employed alongside traditional statistical methods to evaluate functionality and measure the system's impact. Black box testing allows for an assessment of system outputs based on various inputs, ensuring that all features perform as expected without examining the internal code or structure (Asmarajaya et al., 2021). This method focuses on assessing the system's outputs based on various inputs, ensuring that all features perform as expected (Sholeh et al., 2021). By utilizing black box testing, we can effectively identify any discrepancies or issues from the user's perspective, ultimately leading to a more reliable and user-friendly application (Sasmito & Nishom, 2020). The main of the testing in this study is testing using simple linear regression, Pearson Product Moment correlation, and determination coefficient to obtain the impact analysis of system implementation.

Based on the problems and solutions previously mentioned, this research seeks to address urgent needs in the administrative management of Antiga Village by integrating technology with local cultural values. The urgency of this research lies in the need for a culturally aligned, efficient system that addresses transparency and service delivery, critical factors for meeting the administrative demands of the village community. Antiga Village, like many rural areas, faces challenges in delivering timely and transparent services due to limited infrastructure and resources, making the implementation of a technology-based solution essential. The originality of this research stems from the integration of the Panca Satya concept with a modern Correspondence Information System, a unique combination of traditional values and digital technology that has not yet been applied in similar administrative contexts. The Panca Satya concept provides a holistic approach, incorporating local wisdom with modern technology to create a solution that not only improves operational efficiency but also respects and strengthens community values. This approach introduces a novel framework for digital services, where the integration of cultural principles enhances system acceptance and user satisfaction.

The primary objectives of this research are threefold: first, to enhance the capacity of the Antiga village apparatus through targeted training in digital correspondence management; second, to implement a transparent, integrated correspondence application that aligns with local values; and third, to conduct comprehensive technical testing to ensure the system's functionality and effectiveness. This research focuses on introducing HR-based services supported by technology, a new concept for Antiga Village, aimed at strengthening local administrative capacity and transparency. Comprehensive Technical Testing, including black box testing and user acceptance testing, is planned to ensure that the implemented solution functions as intended. By adopting a tested and structured correspondence system approach, this research establishes a state-of-the-art solution that not only addresses immediate administrative needs but also sets a precedent for culturally integrated digital service models in rural communities.

2. METHOD

This research uses a research flow integrated with the SCRUM Model, so in addition to measuring the impact of using the mobile-based correspondence information systems on administrative services in Antiga village guided by panca satya principles as the main research, it also creates related applications and measures their performance.

The research began with a preliminary study, which included a literature review on transparency and service speed in village administration and their relation to the Sustainable Development Goals (SDGs). To ensure a comprehensive understanding of the administrative needs in Antiga Village, the study was conducted with a defined population and sample. The total population of Antiga Village consists of 1.385 family head. The sample included one village head, six heads of banjar (community sub-units), and six resident representatives, one from each banjar for black box testing, and 95 family head in Antiga Village for system implementation impact testing. We also identified the specific needs and challenges of administrative services through structured interviews with these informants. The informants comprised one village head, six heads of banjar, and six residents, chosen to represent the broader population's experiences and perspectives on administrative issues. Field studies were conducted using direct surveys and in-depth interviews with this sample group. The objective was to gather both primary data—through firsthand accounts of the village's administrative processes, and secondary data from literature relevant to the development of correspondence information systems. The literature study mapped existing research related to correspondence information systems and administrative transparency. Additionally, we analyzed other villages' experiences in adopting technology and examined the Panca Satya concept, providing a foundation for integrating these local values into Antiga Village's administrative processes.

The methodology employed the SCRUM model, which was chosen for its relevance and effectiveness in facilitating iterative and incremental system development. Each sprint within the SCRUM framework played a crucial role in the system's advancement, allowing for continuous progress and refinement of the application. In the first sprint, we focused on creating and implementing questionnaires aimed at gathering essential user requirements and feedback from the community. This initial step was critical to understanding the specific needs of the users, ensuring that the system would be tailored to their expectations. The second sprint concentrated on collecting and analyzing secondary data, which informed our design decisions and helped establish best practices based on the experiences of other villages that have adopted similar technologies.

During the third sprint, we moved forward with designing and implementing the system, integrating the valuable user feedback obtained from the first two sprints. This phase was essential for aligning the system's features with the actual needs of Antiga Village residents. The fourth sprint consisted of rigorous testing of the system using black box testing and user acceptance testing, which ensured that the application met all specified requirements and functioned as intended. The choice of the SCRUM model over other methodologies was made due to its inherent flexibility, allowing the development team to adapt quickly to changing conditions and feedback.

This adaptability is particularly important for addressing the dynamic needs of Antiga Village, ensuring that the final product effectively serves the community's administrative requirements.

The result analysis assessed the effectiveness of the solution and identified shortcomings. The final stage involved drawing conclusions and providing recommendations for future development. The final output included the promised web and Android applications.

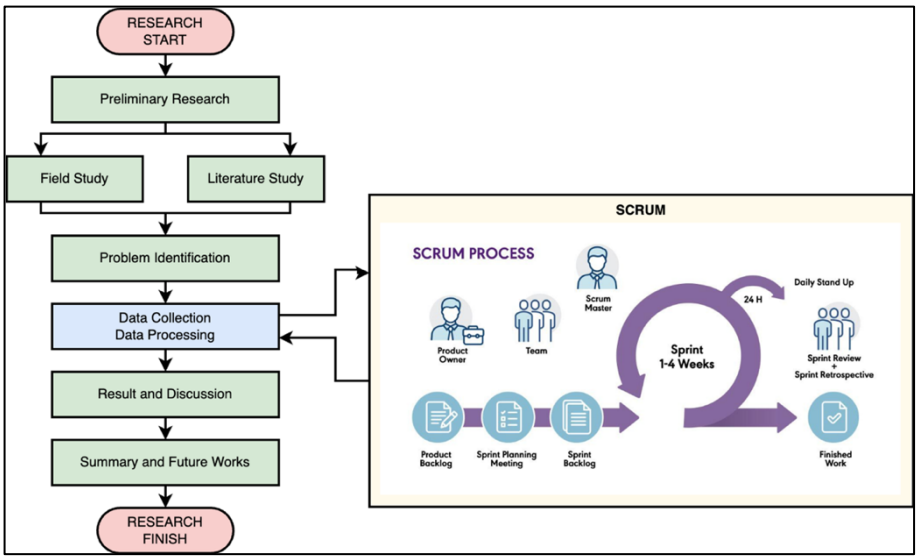

Figure 1. Research Flow Integrated with SCRUM Model

3. RESULT AND DISCUSSION

Below are the results and discussion generated from this research based on the research stages that have been previously explained.

A. Preliminary Research, Field Study and Literature Study Result

The preliminary research phase involves collecting initial data through literature reviews and in-depth interviews. It identifies Antiga village's potential in managing village services, focusing on administration and governance. Key findings reveal challenges in efficiency, particularly in the correspondence system, and highlight the urgent need to enhance administrative services to align with sustainable development goals (SDGs). The research aims to develop a web and mobile-based application to improve the correspondence system and, subsequently, public services.

Field studies in Antiga village indicate that all administrative processes, especially correspondence, are still manual. Observations show that this manual approach causes delays, particularly during peak workloads, and increases the risk of data management errors due to conventional archiving methods. The lack of technology integration results in inefficiencies, long queues, and overwhelmed village officials. The study suggests a pressing need for a modern, technology-based system to optimize correspondence processes and improve service delivery.

The literature study builds on preliminary and field study results, focusing on developing a technology-based correspondence information system. It explores other villages' experiences with technology adoption and the application of Panca Satya values in the planned system. The study concludes that such a system can enhance efficiency, transparency, and service quality, although technological literacy challenges require special training. Panca Satya values ensure the system's cultural relevance and quality, promoting transparency, reliability, equality, dedication, and user comfort.

B. Problem Identification Result

In the effort to identify issues in Antiga village, the application of Panca Satya values becomes crucial to creating solutions that are not only technical but also aligned with the village's ethics, morals, and culture. One of the main issues is the management of correspondence, which is still manual, leading to a lack of transparency. Satya Hredaya emphasizes the importance of creating a transparent system so that residents can easily monitor the status of their applications. Additionally, delays in administrative processes indicate that the promise of quick service has not been fulfilled. With Satya Wacana, it is hoped that there will be a commitment from village officials to provide consistent and timely services through a reliable technology-based system. The conventional archiving

system that slows down document retrieval is also a concern. Satya Mitra encourages the development of a system that facilitates document access and retrieval without discrimination, through fair and equitable digital archiving. The limited use of information technology in administrative services hampers the village's progress. Satya Bhakti directs the creation of technology-based solutions to advance the village as a whole, ensuring web and mobile-based systems drive efficiency and strengthen village governance. Low technological literacy among village officials is another obstacle. Satya Laksana encourages adequate training so that village officials can manage the technology systems perfectly, ensuring optimal and sustainable implementation. In interviews with stakeholders and community needs analysis, these issues are prioritized by considering Panca Satya values, such as improving the efficiency of the correspondence system with transparency and commitment, developing a digital archiving system that emphasizes equality and village progress, and increasing technological literacy for perfect service.

C. Data Collection and Processing Result

1. Sprint 1

During Sprint 1 of this project, the primary focus was on developing and implementing a questionnaire as a primary data collection tool within the SCRUM framework. This questionnaire was designed to gather important information regarding the issues faced in Antiga village, providing in-depth insights into the needs and expectations of the village community. The data collected serves as a strong foundation for subsequent steps in the development of technology-based solutions, taking into account the Panca Satya values as a guiding framework. The main goal of the questionnaire was to identify issues in village administration management based on these values. Respondents provided varied perspectives in this questionnaire, which included questions about the ease of accessing information, satisfaction with service speed, frequency of delays in processes, and the efficiency of the document archiving system. Several respondents highlighted the need for technology training for village officials and increased transparency. Most expressed the importance of enhancing technology use to improve village services. Additionally, the suggestions indicated a desire for better online systems, service applications, and more effective communication and socialization. By reviewing these results, the project can prioritize improvements to enhance the administrative system in Antiga village, aligning with local ethical and cultural principles reflected in the Panca Satya values.

2. Sprint 2

In the Sprint 2 phase of the SCRUM framework, the primary focus is on collecting and analyzing secondary data from literature and previous studies to support the development of the administrative system in Antiga village. This secondary data includes relevant information regarding best practices in village administration management, the use of information technology, and the impact of implementing technology-based systems in similar environments. The results of this analysis will be used to draft a detailed system requirements document, which encompasses the functional and non-functional specifications of the system to be developed. This document aims to ensure that the designed solution not only meets the needs of the village community but also aligns with the previously identified Panca Satya values. With this approach, it is expected that the system development can be conducted in a more directed and effective manner, providing long-term benefits for the people of Antiga village.

Functional specifications include community data management, where village officials can add, edit, and delete relevant information, with the banjar dinas head managing data only within their jurisdiction. The residents of Antiga village can submit correspondence applications through a mobile application, with the system providing forms for various types of documents. Users can monitor the status of their document submissions in real-time and receive notifications of status changes. Additionally, all documents submitted will be stored in an organized digital archiving system, allowing village officials to easily search for and access submitted documents. The system must also be capable of generating reports and analyses concerning the number of submissions, processing times, and other relevant statistics, with analytical data used to improve service efficiency. Integration with Panca Satya values ensures transparency, commitment, and equality in every process. Non-functional specifications include security, with strong mechanisms to protect user data and documents, including encryption and secure user authentication. The system must be available 24/7 with minimal downtime and a disaster recovery plan. Usability is a focus with an intuitive and easy-to-use interface, along with clear user guidelines. The system's performance must be able to handle a large number of users simultaneously without performance degradation, with fast response times. Compatibility with various mobile devices and platforms must be guaranteed, supporting different versions of mobile operating systems. The system must also be scalable, allowing for the addition of new features without disrupting existing operations.

3. Sprint 3

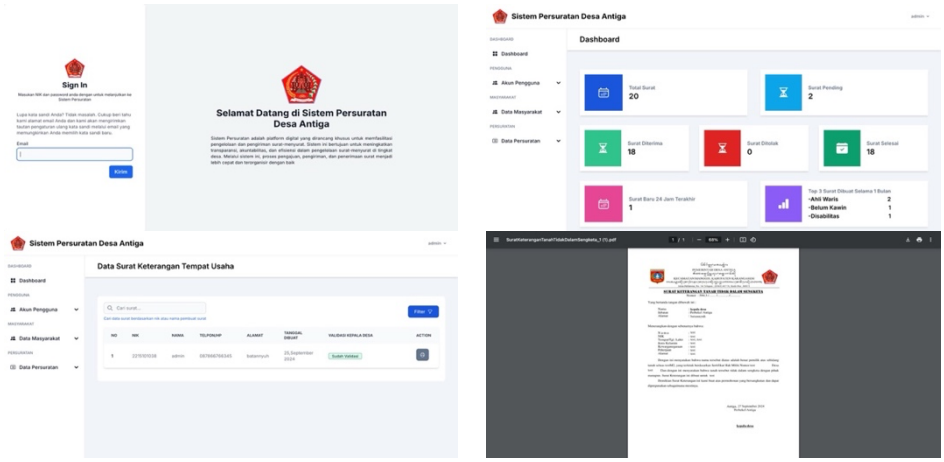

Figure 2. Screenshot Sample for Web-Based Implementation

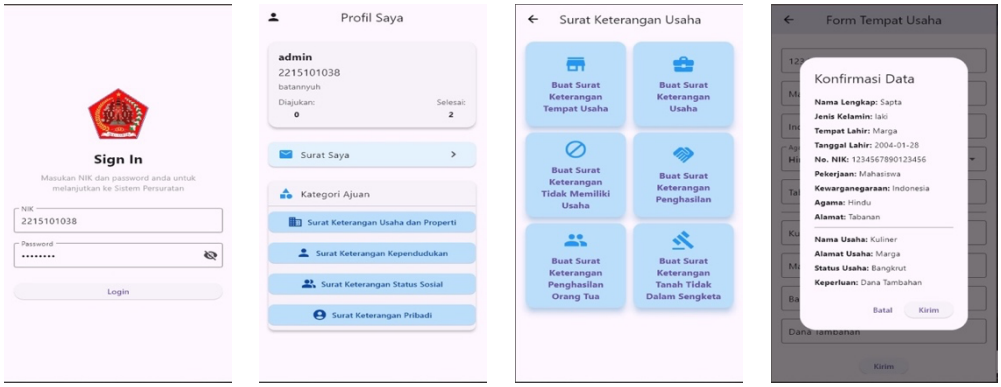

Figure 3. Screenshot Sample for Mobile-Based Implementation

In Sprint 3 of the SCRUM framework, the main focus is to produce a system design for a web and mobile application that will be used by village officials, banjar dinas heads, and the community of Antiga village. This design includes creating user interface mockups and process flow diagrams to ensure that the developed system meets user needs and operates efficiently. In the user interface design, the mobile application mockup is prepared to provide a visual representation of how the application will look and function. Additionally, the process flow diagrams explain the steps in the system implementation. The document submission process begins with the community accessing the mobile application and filling out the submission form. After that, the system stores the submission data and sends notifications to the village officials, who will then process the submission and update the status in the system. The community will receive notifications regarding the status of their submissions.

For the community data management process, village officials and banjar dinas heads will log into the web application, where they can search for community data and manage it, such as adding, editing, or deleting information. Every data change will be recorded in the system to ensure audit and transparency. With this clear and structured system design, it is hoped that the development of the web and mobile application can be carried out more efficiently and meet the needs of users in Antiga village. This approach also ensures that the system built aligns with the values of Panca Satya, providing better and more transparent services for the community.

4. Sprint 4

In Sprint 4 of the SCRUM framework, the main focus is on conducting testing for the applications for the correspondence management system in Antiga village.

A) Functional Testing of the System

The testing process begins with functional testing of the system, where each feature in the application is tested to ensure that all functions work properly, including document submission, status monitoring, and community data management. Involving actual users in the testing provides direct feedback on their experience.

In this testing, seven respondents, consisting of one village head and six banjar leaders, were involved in testing the document submission feature. The test case was executed with clear steps, starting from opening the application to uploading document attachments. The test results showed that out of seven respondents, five successfully submitted their documents, while two experienced failures. The success rate of the testing is 71.43% (5 success per 7 testing), while the failure rate is 28.57%. Here are the testing results and notes from the basic functional testing conducted by the village officials.

Table 1. Functional Testing of the System from Village Officials

Respondent	Test Result	Notes
Village Head	Successful	The submission process went smoothly.
Kaler Banjar Head	Successful	Notification appeared on time.
Kelod Banjar Head	Failed	Failed during attachment upload process.
Ketug Banjar Head	Successful	All data was filled in correctly.
Seraya Banjar Head	Failed	Wrong attachment upload file, failed during attachment upload process.
Labuhan Banjar Head	Successful	Submission was recorded in the system.
Tengading Banjar Head	Successful	Simple user experience.

Although most users were able to use the application effectively, there are several issues that need to be addressed, particularly regarding attachment uploads and application stability. These results provide important insights into the effectiveness of the system and areas that require further attention. Based on several issues encountered in the attachment upload process, improvements were made to address them, followed by black box testing involving 1 village head, 6 banjar heads, and 6 community representatives. The black box testing results are shown in the table below. The results of the black box testing met the expectations of the researchers.

Table 2. Black Box Testing Result

ID	Scenario	Expected Result	Actual Result	Conclusion
1	User accesses the mobile app and submits a document request form.	System stores submission data and sends a notification to village officials for further processing.	System stored data and sent notification	Passed
2	Village official updates the document request status in the system.	System updates the status and sends a notification to the user regarding the status of their request.	Status updated and notification sent to user	Passed
3	User receives notification regarding document request status.	User receives accurate notification reflecting the updated status of their document request.	User received correct status update notification.	Passed
4	Village official logs into the web application.	System grants access, allowing the official to view, add, edit, and delete citizen data.	Access granted with full data management capabilities.	Passed
5	Village official modifies a citizen's data entry.	System records data modification and logs changes for audit purposes.	System recorded and logged modification	Passed
6	Village official searches for specific citizen data.	System retrieves accurate and relevant data based on search criteria.	System retrieved accurate data.	Passed
7	Village official deletes a citizen data entry.	System successfully deletes the data and logs the deletion action for transparency and audit.	Data deleted and action logged.	Passed
8	Verify if all data changes are recorded in system logs.	System logs each data change (add, edit, delete) for transparency and future audits.	All data changes were correctly logged.	Passed

B) Impact Analysis of System Implementation Testing

In analyzing the extent of the impact of implementing the information management system for correspondence management in Antiga village on administrative services, the researcher conducted data quality testing (validity and reliability), followed by simple linear regression, Pearson Product Moment correlation, and

the coefficient of determination. The impact of the system implementation is influenced by the principles of Panca Srada. To obtain the necessary data, the author distributed questionnaires to 95 respondents selected from the household head population of Antiga village, based on Slovin's formula for 1,385 household heads in Antiga village, with a margin of error of 10%, resulting in a minimum of 93.226 respondents.

1) Simple Linear Regression Analysis

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.572	1	37.572	10.705	.001[b]
	Residual	326.403	93	3.510		
	Total	363.975	94			

a. Dependent Variable: Layanan Persuratan

b. Predictors: (Constant), Penerapan SI Persuratan Antiga

Figure 4. ANOVA Testing using Simple Linear Regression

To determine whether the linear regression model is correct or not, we can use the ANOVA table from the data processing results in SPSS 29.0 for Mac.\
If the significance value < 0.05, then the linear regression model is correct and significant.
If the significance value > 0.05, then the linear regression model is incorrect and not significant.

In the sig. column, a significant value of 0.01 is observed. Since the significant value < 0.05, it can be concluded that the linear regression model is correct and significant.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	31.435	2.987		10.522	<.001
	Penerapan SI Persuratan Antiga	.196	.060	.321	3.272	.001

a. Dependent Variable: Layanan Persuratan

Figure 5. Coefficients Testing using Simple Linear Regression

The Coefficient table is useful for determining the equation of how much impact the implementation of the scheduling information system for the Antiga village and the information services of village officials has, resulting in the impact equation:

$$Y = 31{,}435 + 0{,}196X$$

Before the implementation of the scheduling information system for the Antiga village, the information services of village officials had a value of 31.435. After the implementation of the web-based management information system, there can be an increase or decrease in performance of 0.196 from the implementation of the scheduling information system for the Antiga village.

2) Pearson Product Moment Correlation Analysis

The strength of the relationship between variable X and variable Y in this study is demonstrated using Pearson Product Moment correlation analysis, as the author employs descriptive analysis methods and interval measurement scales. The Product Moment correlation analysis is used to measure the strength of the relationship and to prove the hypothesis regarding the relationship between the implementation of the scheduling information system for the Antiga village and the information services of village officials.

Correlations

		Layanan Persuratan	Penerapan SI Persuratan Antiga
Layanan Persuratan	Pearson Correlation	1	.321**
	Sig. (2-tailed)		.001
	N	95	95
Penerapan SI Persuratan Antiga	Pearson Correlation	.321**	1
	Sig. (2-tailed)	.001	
	N	95	95

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 6. Correlations Testing using Bivariate Correlations

The output figure from the Pearson Product Moment correlation between the implementation of the scheduling information system for the Antiga village and the information services of village officials yields a value of 0.321. This value indicates a low relationship between the two variables, while the positive sign (+) indicates that the greater the changes occurring in the implementation of the scheduling information system for the Antiga

village, the greater the changes in the information services of village officials, and vice versa. This relationship is termed a direct relationship. The correlation between the web-based management information system implementation and employee performance is significant for testing at a 10% error level or a 90% confidence level.

3) Coefficient of Determination Analysis

To determine the extent of the impact of the implementation of the scheduling information system for the Antiga village and the information services of village officials, a coefficient of determination analysis was conducted, using the following formula:

$$CoD = r^2 \times 100\%$$
$$CoD = (0{,}321)^2 \times 100\% = 10{,}3\%$$

Based on the calculation results, the coefficient of determination (CoD) is obtained at 10.3%. This figure indicates the extent of the impact of the implementation of the scheduling information system for the Antiga village on the information services of village officials. Meanwhile, the remaining 89.7% is influenced by other factors.

D. Discussion

The application of Panca Satya values in the administrative management of Antiga Village serves not only as a moral guideline but also as a comprehensive framework at every stage of system development. Previous studies, such as those by Supiyandi and Martadala, have shown that integrating local cultural values can significantly enhance public service acceptance and engagement (Martadala et al., 2021; Supiyandi et al., 2022). This research builds on these findings by implementing Panca Satya, demonstrating how values like transparency, commitment, and dedication can be embedded into a digital system to improve administrative services.

In Sprint 1, the questionnaire designed to identify issues in village administrative management indicated a strong community desire for transparency and speed in services. Many respondents reported difficulties in accessing information about the status of their document submissions, aligning with the value of Satya Hrêdaya (Sincerity of Heart), which emphasizes the importance of transparency. This mirrors findings by Tjhin, who observed that transparency in service processes directly influences community satisfaction and trust in village administration (Tjhin et al., 2021). Based on these insights, the developed system prioritized features that allow the community to monitor submission statuses in real-time.

During Sprint 3, the system design included mockups for the user interface and process flow diagrams to align the system with user needs. The document submission feature was carefully crafted to enable community members to submit forms directly and receive timely updates, reflecting Satya Wacana (Commitment to Promises) in the dedication of village officials to provide efficient services. Black box testing results highlighted the strengths of this feature, with 71.43% of respondents successfully submitting their documents. However, 28.57% faced challenges, particularly with attachment uploads, indicating that the interface needed further refinement. These findings align with Asmarajaya, who emphasize the importance of a user-centered design to reduce errors and enhance usability (Asmarajaya et al., 2021).

The impact analysis conducted using Figure 5 revealed a positive relationship between system implementation and service improvement, with a coefficient of determination of 10.3%. This low coefficient suggests that the system alone accounts for a modest portion of variability in service performance, a finding consistent with Santos, who noted that digital tools require supporting factors to realize their full potential (Santos et al., 2023). This suggests that other elements—such as community engagement and technological literacy—play a significant role. Further studies by Mukhsin, highlight that technological literacy among village officials is crucial to maximizing system effectiveness, a factor that was also observed in this study (Mukhsin, 2020).

The benefits of the Panca Srada values (Faith in Belief) implemented in this research are notable, as they provide a foundational mindset encouraging dedication and responsibility among officials when utilizing the system. This approach not only supports system efficiency but fosters a sense of accountability, making it more than a functional tool; it becomes an extension of the village's ethical framework. To address the identified challenges, future system iterations will focus on enhancing user interface intuitiveness, particularly in the attachment upload process, by simplifying steps and providing detailed instructions to accommodate all technical skill levels.

Black box testing and impact assessment were essential components of the study, revealing critical insights into system performance and areas needing improvement. These tests demonstrated the value of a user-friendly design and transparent operation, both of which were improved by the application of Panca Satya and Panca Srada values, aligning with previous findings by Galushi & Malatji (Galushi & Malatji, 2022). Further

research is recommended to explore additional influences on administrative effectiveness, such as socio-economic factors and policy changes, to deepen our understanding of how best to support rural administrative systems.

4. CONCLUSION

The implementation of the management information system for correspondence in Antiga Village demonstrates a novel approach by integrating the Panca Satya values, which function as a unique moral and cultural framework in enhancing public service. This combination of cultural principles with modern technology is rarely explored in village administrative systems, positioning this research as a pioneering model for culturally integrated digital solutions. Functional testing results indicate that 71.43% of respondents successfully used the application for document submission, yet issues remain with attachment uploads and application stability. The impact analysis of system implementation shows a positive relationship between the system and improvements in administrative service performance, with a determination coefficient of 10.3%. This finding underscores that while the system positively affects service delivery, additional factors also contribute to overall performance, signaling opportunities for further enhancement.

This study contributes to the field by demonstrating how cultural values, specifically Panca Satya, can be embedded within a digital information system, creating a system that not only improves service efficiency but also aligns with community values. Additionally, the research highlights the importance of technological literacy and transparency in fostering public trust and engagement. This framework can serve as a reference for similar administrative systems in rural areas, aiming to balance modern technology with local values. Several limitations were identified during the study. The system's initial deployment faced challenges related to user interface intuitiveness, particularly in the attachment upload process, affecting usability for some users. Additionally, the limited scope of the impact analysis—focused primarily on system functionality—means that other influencing factors, such as socio-economic and educational variables, were not comprehensively explored.

To improve the effectiveness of the management information system, emphasis should be placed on refining the attachment upload feature and enhancing application stability. Future research should consider a broader impact analysis, examining external factors like socio-economic influences and community engagement levels. Providing regular training for village officials can further improve technological literacy, helping them manage the system effectively. Additionally, developing transparent features within the system will allow the community to track document submission statuses more easily. Integrating the system with advanced mobile applications could also foster closer interaction between the community and village officials, enhancing public service delivery..

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