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Improving Population Administration Services at the Buleleng Regency Population and Civil Registry Office through the Development of 6 Service Innovations, Detailed Service Information Systems, and Service Monitoring Displays

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Abstract

The Population and Civil Registration Service of Buleleng Regency has been managing population data since 2022 through the AKUOnline application and in 2023 it will develop into AKUOnline-NG. In 2024, AKUOnline-NG will be available in a PWA (progressive web apps) version and can be accessed via mobile devices by all residents of Buleleng Regency. With the largest population in Bali Province, public administration services for population through AKUOnline-NG need to be improved. In order to prepare open access for AKUOnline-NG to 826,000 residents of Buleleng and anticipate complaints/questions related to AKUOnline-NG which currently only provides a login page. In addition, to accommodate 6 innovation services (BALITA, AKSAMA, NYAKSI, SAKKINAH, APISAN and KK DILAN) which currently do not have features, AKUOnline-NG needs to be further developed. The purpose of this study is the development of AKUOnline-NG in accommodating 6 innovation services, improving the detailed service information system (SIM) not just a login page, and developing a service monitoring display so that evaluations can be carried out on public services. In addition, this study also aims to determine the impact of the implementation of 6 digital-based service innovations, detailed SIM services and monitoring displays on improving public services. During the implementation of the study, qualitative research was conducted to determine the business processes that would be digitized and the agile development approach so that it could involve users, especially Disdukcapil. In addition, quantitative research was conducted with the USE questionnaire (usefulness, satisfaction and ease of use) as a model of technology acceptance.

Keywords: *Administrative Services, Digitalization, Disdukcapil, Service Innovation, Service Monitoring.*

Introduction

Population administration services are one of the crucial elements in public services in Indonesia (Nuottila et al., 2016). With the population continuing to increase, the need for an efficient and fast system is becoming increasingly important (Antoni et al., 2020). The manual processes that have been used in many government agencies often cause various problems, ranging from long queues to slow service (Sofyani et al., 2020). In the midst of the fast-paced digital era, the transformation of population administration services into digital form is a must. Buleleng Regency, as the regency with the largest population in Bali Province, faces a major challenge in providing adequate and responsive administration services for its people of more than 826,000 people. The Population and Civil Registration Service (Disdukcapil) of Buleleng Regency has a central role in ensuring the availability of effective and efficient administration services. Based on the principles of regional autonomy and assistance tasks, the Buleleng Disdukcapil continues to strive to improve the quality of its services through the use of information technology. Since 2022, Disdukcapil has managed population data digitally through the AKUOnline application. With features that simplify the administration process, this application has helped reduce the burden of manual work. However, technological developments and increasingly complex community needs require further development of this application.

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In 2023, Disdukcapil launched a new version of the application called AKUOnline-NG (Next Generation). This application is not only used internally by the service, but has also been integrated with 148 villages in Buleleng Regency through village operators. This transformation provides wider access and simplifies the administration process at the local level. In its development plan, in 2024, AKUOnline-NG will be released in the Progressive Web Apps (PWA) version which allows easy access via mobile devices. This initiative aims to provide more inclusive and responsive services to the entire community of Buleleng Regency.

Although digitalization has occurred, there are still several obstacles faced in the process of implementing the AKUOnline-NG service. One of the main challenges is the lack of features that support the six new service innovations being formulated by Buleleng Regency, namely BALITA (Healthy and Registered Babies), NYAKSI (Comfortable and Safe Ready for Identity), AKSAMA (Legitimate Access to Serve You), SAKKINAH (Legitimate, Fast, and Blessing), APISAN (Marriage Certificate, Islam, and Other Religions), and KK DILAN (Digital Family Card Safe and Comfortable Service). The supporting features for these innovations have not been integrated into AKUOnline-NG, which means that the service process still requires further improvement.

In addition, the public still has difficulty understanding the details of the population administration services provided by AKUOnline-NG. Lack of information such as service descriptions, requirements, application mechanisms, prerequisite forms, documents to be uploaded, and document results often confuse the public in using the application. To overcome this problem, the development of a detailed and user-friendly information system is a top priority. Not only the public who need clear information, village operators and service officers also need a transparent and real-time monitoring system to monitor and evaluate service performance effectively.

This study focuses on the development of six service innovations, a detailed service information system, and a display monitoring system at the Buleleng Regency Population and Civil Registry Office to improve the quality of population administration services. The Agile Development approach is used in the system development process to ensure flexibility and speed of iteration, allowing rapid adjustment to user needs. Agile Development provides an adaptive and collaborative framework, which is very relevant in the development of a continuously evolving public service system.

This study also uses a quantitative approach to evaluate the acceptance of technology by users through a questionnaire that adopts the USE model (Usefulness, Satisfaction, and Ease of Use). This model helps measure the extent to which the development of the AKUOnline-NG system is able to meet user needs, both in terms of ease of use, level of satisfaction, and perceived benefits. The results of this study are expected to provide a comprehensive solution in improving population administration services in Buleleng Regency. By accommodating service innovations, improving information systems, and providing transparent monitoring displays, the Buleleng Disdukcapil is expected to be able to improve the efficiency, effectiveness, and quality of services to the community. This not only supports digital transformation at the local level, but also strengthens the foundation of public services that are oriented towards community needs.

Literature Review

Digitalization of Public Services

The digitalization of public services has become a global trend in an effort to improve the quality, efficiency, and effectiveness of government services to the public (Utama, 2020). This transformation not only aims to increase the speed of the administrative process, but also to facilitate public access to services that were previously difficult to reach, especially in areas with challenging geographical conditions (Sittig et al., 2020).

According to (Sisilianingsih et al., 2024), the digitalization of public services in Indonesia has had a significant positive impact. One of the main benefits noted is the acceleration of service time, which allows people to get services in a matter of hours or even minutes, compared to manual processes that take days

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to weeks (Faruq & Maryam, 2023). This is very relevant in Indonesia, considering that this country has quite significant geographical challenges, with more than 17,000 islands and varying infrastructure in each region.

In addition to accelerating time, digitalization also increases service accessibility. Digital platforms allow people in remote areas to access government services that were previously only available at central offices (Faruq & Maryam, 2023). This innovation allows for more equitable service provision throughout Indonesia. For example, population service applications implemented in various districts allow residents to apply for ID cards, birth certificates, or family cards online without having to come directly to government offices. According to research by (Purwanto et al., 2020), the implementation of a digital system in population administration services in Central Java showed an increase in public participation of up to 40% due to this ease of access.

Digitalization also has important implications for transparency and accountability. With a digital system, every service process is recorded automatically, so that the process trail can be easily traced. This helps reduce the opportunity for corrupt practices and increases public trust in the government. According to a survey conducted by the Indonesian Public Policy Study Institute (LKKPI) in 2023, as many as 78% of respondents felt more confident in digital-based public services because of the transparency in the process and clear service results.

However, this digital transformation also presents various challenges that need to be overcome. One of them is the readiness of information and communication technology (ICT) infrastructure in various regions. Areas that have limited internet access or poor network quality tend to have difficulty accessing digital services. According to research conducted by (Arianto, 2021), digital inequality in Indonesia is still quite high, where 65% of rural areas do not have adequate internet access, which can hinder the success of the digitalization of public services.

Another challenge is the digital literacy of the community. The digitalization of public services requires a technology-literate community in order to optimally utilize services. To overcome this challenge, the government and various non-governmental institutions have collaborated in providing digital literacy education and training programs for the community, especially in rural areas. According to data from the Ministry of Communication and Information (2022), there has been a 30% increase in participation in digital training since the initiation of the digital literacy program in 2020, which shows an increase in public awareness of the importance of digital skills.

In addition, the development of policies and regulations that support digital transformation is also an important factor. The government needs to ensure that existing regulations are able to accommodate technological developments and protect the rights and personal data of the public. According to (Komolafe et al., 2024), the development of a regulatory framework related to data security and user privacy is a priority in accelerating the adoption of digital services in the public sector. Overall, the digitalization of public services has paved the way for a significant transformation in the provision of government services. With accelerated processes, increased accessibility, and better transparency, the public can now feel the benefits of faster, easier, and more reliable services. Although there are various challenges that need to be overcome, collaboration between the government, the private sector, and the public is believed to be able to drive the success of this digital transformation. Continuous efforts to improve infrastructure, increase digital literacy, and build strong regulations will be the key to the successful implementation of the digitalization of public services in Indonesia.

Agile Development in Public Information Systems

The agile development approach has become one of the main methods in modern software development, mainly due to its flexibility in dealing with changing user needs and its ability to produce fast and iterative results. Agile focuses on intensive collaboration between development teams, stakeholders, and end users to ensure that the software developed can effectively meet changing needs (Trischler & Westman Trischler, 2022). In the context of public services, this approach is increasingly relevant considering the characteristics of public service needs which are dynamic and often influenced by regulatory changes. In its

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implementation, Agile uses the iteration or sprint method to develop software in stages. This iteration allows for evaluation of work results in a short time so that the team can adjust priorities based on user feedback. According to (Ferlie & Ongaro, 2022), Agile's ability to adapt to change makes it an ideal method for projects that require high flexibility, such as public information systems. In the context of public information systems, Agile Development provides strategic advantages in designing and implementing technology solutions that serve the public. Some of the advantages of Agile that are relevant to the development of public information systems;

Flexibility to Changing Needs

Public services often experience changing needs due to new regulations, government priorities, or evolving community needs. Agile allows developers to quickly adapt systems to these changes without disrupting ongoing workflows. For example, the implementation of Agile in a population administration service information system allows for feature updates when there are changes in policies related to population documents (Rachmawati et al., 2021).

Increased Collaboration

Agile encourages intensive collaboration between the development team, the government as stakeholders, and the community as end users. By actively involving users in the development process, Agile ensures that the system being developed truly meets the needs of the community. A study by (Adhiatma et al., 2022) showed that the Agile approach increased user satisfaction by up to 30% in a digital-based health service information system development project. (1) Short iterations in the Agile method allow the government to launch a usable system in a short time, even if the system is not yet fully completed. This approach ensures that the public can start using the main features while developers continue to improve and add to the system's functionality. (2) Public information systems often face high risks due to project complexity, ranging from technical constraints to inconsistencies with user needs. With the Agile approach, each iteration provides an opportunity to evaluate the results of the work so that potential errors can be detected early. According to (Mutiarin et al., 2024), the Agile approach succeeded in reducing the risk of project delays by up to 45% in the development of an online tax service system in Indonesia.

Public Service Monitoring System

Real-time monitoring systems have become an important part of efforts to improve the quality of public services in the digital era. This system allows decision-makers to monitor the service process directly and make necessary adjustments quickly, thus providing significant benefits for the efficiency and effectiveness of public services. According to (Rivelino, 2022), the implementation of a real-time monitoring system in public administration provides accurate and up-to-date data to decision-makers, enabling a faster response to problems in the field. A real-time monitoring system refers to technologies and methods that enable the collection, analysis, and reporting of data directly as it is generated. With the support of information and communication technology (ICT), this system can integrate various data sources, such as IoT (Internet of Things) devices, cloud-based systems, and sensors, to provide a continuous picture of current conditions. The implementation of a real-time monitoring system in the public sector has been shown to provide various benefits, including: (1) increasing operational efficiency by providing accurate and real-time data, this system allows decision-makers to identify and reduce inefficiencies in the service process. (2) Data-based decision makingReal-time monitoring systems provide reliable, up-to-date data to support fast and accurate decision making. This is very important in dealing with emergency situations or sudden changes in community needs. Kurniawan (2020) noted that in the context of public administration, real-time data allows for better planning and policy adjustments based on actual conditions in the field. (3) Increasing transparency and accountabilityReal-time monitoring systems can increase the transparency of public services by providing open data access to stakeholders. This also strengthens accountability because every service process can be monitored and tracked directly. For example, in the transportation sector, this system allows for real-time monitoring of bus or train schedules, so that the public can monitor the performance of public transportation services. (4) Faster problem detection allows for early identification of emerging problems, so that corrective measures can be taken immediately before the problem has a major impact on

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services. In smart city management, real-time monitoring systems can detect disruptions to infrastructure such as street lights, water pipes, or electricity networks, so that repairs can be made quickly.

Blackbox Testing in System Testing

Blackbox Testing is a software testing method that focuses on checking the functionality of a system based on predetermined specifications, without considering its internal structure or source code. This method aims to ensure that the system works according to user needs and predetermined requirements. According to (Jameaba, 2024), blackbox testing is an important element in the software development cycle, especially in testing digital service features, to ensure that the system can be implemented properly without any functional defects. In blackbox testing, the tester only focuses on the input and output of the system, without knowing or learning how the internal process or logic of the system works. The blackbox testing method is also called behavioral testing because it is oriented towards system behavior from the user's perspective.

Research Methods

The discussion was attended by the proposing team (Dadang Hermawan, I Ketut Putu Suniantara, Ini Wayan Cahya Ayu Pratami), the expert team of system developers & analysts (Bagus Made Sabda Nirmala, I Kadek Juliana Parwanta, I Nyoman Wiyana, I Putu Adi Putrayasa, Agung Wisnu Asmara Oliva, I Putu Tejakusuma Dharmayoga) and partners (Head of the Population and Civil Registry Office - I Made Juartawan, IT Staff of the Population and Civil Registry Office - Dewa Eka Saputra, Werdika Yudi).

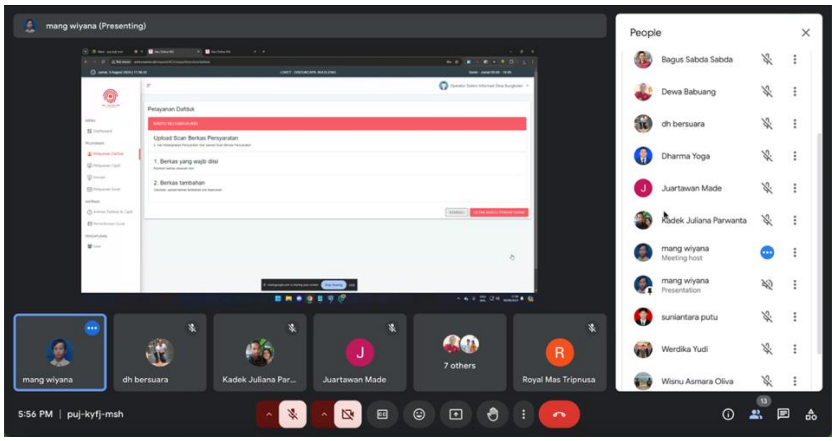

Figure 1. Observation of the AKUOnline-NG System and Online Discussion Between the Proposing Team, Expert Team and Partners of the Buleleng Regency Dukcapil Service

This study uses the Agile Development approach to develop the AKUOnline-NG system, a digital platform that includes six new service innovations that are being formulated by Buleleng Regency, namely BALITA (Baby Born Healthy and Registered), NYAKSI (Comfortable and Safe Ready for Identity), AKSAMA (Legitimate Access to Serve You), SAKKINAH (Legitimate, Fast, and Blessing), APISAN (Marriage Certificate, Islam, and Other Religions), and KK DILAN (Digital Family Card Safe and Comfortable Service). The Agile Development method was chosen because of its flexibility and speed in adjusting to changing user needs, thus ensuring the development of a system that is responsive to feedback from users and stakeholders. The stages of this research are designed to cover the entire cycle of system development based on digitalization of public services and include needs analysis, design, development, testing, implementation, and evaluation activities. The following are the stages carried out in this study;

Needs Analysis

The needs analysis aims to understand the needs of users and stakeholders at the Buleleng Dukcapil Service regarding the system to be developed through observations carried out by studying the service processes

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currently running at the Buleleng Dukcapil Service and direct interviews with employees and agency leaders to identify challenges, opportunities, and specific needs for service features and innovations.

System Design

Based on the results of the needs analysis, a system design is carried out that supports the needs and features that have been determined, namely (1) Designing a system architecture structure that includes various services and main components. (2) Designing a user interface (UI/UX) to ensure an intuitive user experience. (3) Developing a monitoring system design to facilitate real-time service monitoring.

System Development and Testing

At this stage, the system is developed in stages using the Agile Development method, including (1) Development is carried out in sprints with a duration of 2-4 weeks. Each sprint produces certain features or modules that are ready to be tested. (2) The development team works collaboratively with stakeholders to ensure alignment of results with predetermined needs. (3) Each module is tested using the Blackbox Testing method to verify that the system functions work according to specifications without examining the internal structure or code. (4) Input from testing is used to improve and enhance the system in the next iteration.

Implementation and Evaluation

This stage involves the launch of the system in the operational environment of the Buleleng Dukcapil Service, followed by an evaluation to measure the success of the implementation. The implementation is carried out directly with the AKUOnline-NG System integrated into the Buleleng Dukcapil Service's technological infrastructure and training is carried out for staff to ensure they understand how to use the system. Meanwhile, the evaluation stage includes an assessment using the USE Questionnaire (Usability, Satisfaction, Efficiency) to measure the acceptance, satisfaction, and efficiency of the system by users.

Research Context

Digitization of public services has been proven to improve efficiency, accessibility, and transparency of services, especially in areas with extensive geographical challenges. As the largest district in Bali, Buleleng faces various challenges in providing services to residents spread across hard-to-reach areas. This study aims to answer these challenges by developing a system that can increase the speed and ease of access to public services through technological innovation.

Research Procedures

This research follows a systematic procedure designed to ensure that the development of the system runs according to the needs and specifications set. These stages are summarized in the form of a procedure chart that includes needs analysis, design, development, testing, implementation, and evaluation. Buleleng is one of the largest regencies geographically and has the largest population in the province of Bali. This research has been carried out in accordance with the research procedures established by the proposing team. The research procedures are shown in the table below.

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Table 1. Research Procedure

Preliminary study to determine the need for digital innovation in Adminduk with research instruments through observation, field & interviews.
Information system design analysis Development of innovation with Agile approach
Blackox testing for 6 Adminduk Innovations, Service Details and Display Monitoring
Implementation in the Buleleng Civil Registration Service and Socialization to the community Bugs hunting & fixing
Quantitative research on improving public services at the Buleleng Civil Registry Office Planning of research instruments in the form of questionnaires
Data collection, questionnaire distribution, questionnaire data reduction, validity & reliability testing
Drawing conclusions

Results and Discussion

Development of Six Service Innovations

The results of the research and development of six service innovations carried out show concrete steps in efforts to increase efficiency, accessibility and quality of public services, especially in the field of population administration. The six service innovations developed in this study are:

- BALITA (Baby Born with a Birth Certificate): Simplifies the process of issuing birth certificates.
- NYAKSI (Submitting Marriage Certificates During Marriage): Automatic submission of marriage certificates when the marriage is registered.
- AKSAMA (Death Certificate Submitted While Still in Mourning): Accelerates the issuance of death certificates.
- SAKKINAH (Submitting Family Cards During Marriage): Submission of Family Cards during marriage.
- SEMPOA (Foreigner Service System): Special service for foreign citizens.
- KK DILAN (Family Cards Submitted in Court): Family Card Processing through the court.

This development is based on the results of interviews with Disdukcapil staff and the community who identified the need for more efficient and accessible services.

Development of Detailed Service Information System

SIM Detail Service was developed to provide complete information related to population administration services, such as service descriptions, document requirements, and submission procedures. This system is integrated into AKUOnline-NG and accessed by the public through an easy-to-use interface. This SIM is expected to reduce submission errors that are often caused by the public's lack of understanding of service requirements.

Development of Service Monitoring Display System

The display monitoring system allows Disdukcapil leaders to monitor service performance in real-time. This system displays the number of incoming requests, service status, and completion time. This system helps identify bottlenecks in the service process and provides the data needed to make quick and accurate decisions.

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Test Results with Blackbox Testing

Blackbox Testing is used to test the features of six service innovations, SIM Detail Service, and display monitoring system. The test results show that all features function according to specifications. This testing helps ensure that the system is ready to be implemented and used by the community and Disdukcapil.

Evaluation Results with USE Questionnaire

The evaluation was conducted by distributing the USE Questionnaire to system users to measure usefulness, ease of use, ease of learning, and satisfaction. The results showed a high level of satisfaction from users, especially in terms of accessibility and ease of use of digital service innovations.

Conclusion

This study successfully developed and implemented six service innovations, SIM Detail Services, and display monitoring systems at the Buleleng Regency Population and Civil Registry Office. The results of the study showed that this digital innovation was able to improve the efficiency, accessibility, and quality of public services. The use of the Agile Development approach allows the development of a flexible and responsive system to user needs. This implementation is also expected to be a model for other districts that want to adopt a similar system in order to improve population administration services.

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