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Implementation of the Scrum Framework in the Agile Methodology for Developing Move-in Services on the Website of the Department of Population and Civil Registration of Lamongan Regency

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ABSTRACT

Digital transformation in public services has become an essential need to improve the effectiveness, efficiency, and accessibility of population administration services. The official website of the Department of Population and Civil Registration of Lamongan Regency has been established; however, the available services are still dominated by one-way information delivery and have not yet supported end-to-end administrative processes, particularly for population move-in services. This study aimed to implement the Scrum framework within the Agile methodology to develop a website-based prototype of move-in services that is more responsive to public needs.

This study employed a descriptive qualitative approach using the Agile development model with the Scrum framework. The research stages included identifying user requirements, preparing a product backlog, conducting sprint planning, developing the prototype, evaluating through sprint reviews, and making continuous improvements through sprint retrospectives. Data were collected through observation, interviews, documentation, and literature review related to digital public services and population administration.

The results showed that the implementation of Scrum was able to support a structured, adaptive, and collaborative system development process. The resulting prototype contained main features such as online applications for move-in services, document upload facilities, application status tracking, and service process notifications. The system was considered capable of simplifying manual administrative procedures, accelerating service time, increasing transparency, and enabling citizens to access services anytime and anywhere.

In conclusion, the implementation of the Scrum framework within the Agile methodology was effective for developing website-based public administrative services. The iterative approach allowed the system to be continuously adjusted according to user needs and organizational dynamics. The developed prototype of move-in services has the potential to become a model of digital innovation for improving the quality of population administration services at the local government level.

Keywords: Scrum Framework, Agile Methodology, Move-in Services, Digital Transformation, Prototype

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INTRODUCTION

Digital transformation in public service delivery has become an important demand for local governments in improving service quality for the community. The development of information technology has encouraged a shift from conventional service systems to digital systems that are faster, more efficient, transparent, and easily accessible. In the context of modern governance, the digitalization of public services is no longer an option, but a strategic necessity to meet increasing

public expectations for convenience and service speed. One of the sectors that requires accelerated digital transformation is population administration services.

Population administration services play an important role because they are directly related to citizens' legal identity, demographic data, and access to various other public services. The Department of Population and Civil Registration of Lamongan Regency, as the institution responsible for managing population administration, has provided an official website as a source of service information. However, the available services are still dominated by one-way information delivery, such as document requirements, service procedures, and operating schedules. The system has not fully supported comprehensive digital services, particularly for move-in and population services.

Move-in and services are one form of population administration service that requires data verification, domicile transfer, family card updates, and synchronization of demographic records. This process is often still carried out manually through direct visits to service offices. Such conditions create queues, long waiting times, the potential for administrative errors, and limited access for citizens who face time and distance constraints. Many citizens still experience difficulties due to complicated procedures and lengthy administrative processes (Meuleman, 2021). On the other hand, increasing internet penetration and the widespread use of digital devices indicate that website-based administrative services are highly feasible to be implemented more broadly.

The implementation of digital systems for move-in services requires a development method that is flexible and able to adapt to changing user needs. One relevant approach is the Agile methodology. Agile is a software development approach that emphasizes collaboration, iterative development, and adaptability to changing requirements (Adriana N Dugbartey & Olalekan Kehinde, 2025). In practice, Agile often uses the Scrum framework as a structured project management tool through sprint cycles. Scrum enables development teams to prioritize tasks, conduct regular evaluations, and deliver products incrementally according to user needs (Choetkiertikul et al., 2025).

The use of Scrum in the public sector has significant potential because public bureaucracy requires systems that are adaptive yet measurable. Through sprint planning, daily scrum, sprint review, and sprint retrospective, system development can be carried out collaboratively between developers and stakeholders. This approach is important to ensure that the developed system truly meets the needs of both the organization and the community as end users. Scrum also supports continuous improvement in every development cycle (Werewka & Spiechowicz, 2017).

Previous studies have shown that the Agile methodology can improve the effectiveness of information system development and the quality of digital public services. Research by Arifin and Nallappan (2023) found that Agile implementation in e-government can increase transparency and accountability in public services. Meanwhile, Prabowo and Harsono (2025) stated that Agile-based web systems can improve the efficiency of public administrative services. However, studies specifically discussing the implementation of the Scrum framework in population administration services, especially move-in services at the local government level, remain limited. This indicates both contextual and methodological research gaps.

Based on these issues, this study focuses on developing a website-based prototype for move-in services at the Department of Population and Civil Registration of Lamongan Regency using the Scrum framework within the Agile methodology. The developed prototype is designed to include features such as online applications, document uploads, service status tracking, and administrative process notifications. The presence of this system is expected to make it easier for citizens to process population transfers without having to visit the service office directly.

The purpose of this study was to analyze and implement the Scrum framework within the Agile methodology for developing move-in services on the website of the Department of Population and Civil Registration of Lamongan Regency in order to produce a digital service model that is effective, efficient, and aligned with public needs.

METHOD

Study participants

This study employed a descriptive qualitative approach focusing on the development of a website-based prototype for move-in services at the Department of Population and Civil Registration of Lamongan Regency. Research participants were selected using purposive sampling, in which informants were intentionally chosen based on their relevance, knowledge, experience, and direct involvement in population administration services.

The participants consisted of internal and external groups. Internal participants included officials responsible for population administration services, service operators, and staff who understood the service information system. External participants consisted of community members who had used or intended to use move-in services. The involvement of both groups aimed to obtain system requirements from both service providers and end users.

Table 1. Research Participants

No	Participants	Total	Role
1	Service management officials	1	Policy and service supervision
2	Population service operators	2	Administrative implementers
3	Information technology staff	1	Technical support
4	Community members / users	4	End users
Total		**8**	

Study organization

This study was conducted at the Department of Population and Civil Registration of Lamongan Regency. The research design applied the Agile methodology using the Scrum framework as the system development approach. Agile emphasizes flexibility, collaboration, and incremental product delivery according to changing user needs (Adriana N Dugbartey & Olalekan Kehinde, 2025). Scrum was selected because it provides a structured framework through sprint cycles and continuous evaluation (Choetkiertikul et al., 2025).

The study began with preliminary observation of the existing service system, identification of problems in move-in services, and collection of user requirements through interviews and documentation. The identified requirements were then arranged into a *product backlog* containing a prioritized list of system features.

The next stage was *sprint planning*, which determined the development targets for each sprint. The main features developed included online application forms, document upload facilities, application status tracking, and service process notifications. After development, each sprint result was evaluated through a *sprint review* with research participants. Furthermore, a *sprint retrospective* was conducted to identify obstacles and improvements for the next iteration until the final prototype was completed. This iterative cycle supports continuous improvement during system development (Werewka & Spiechowicz, 2017).

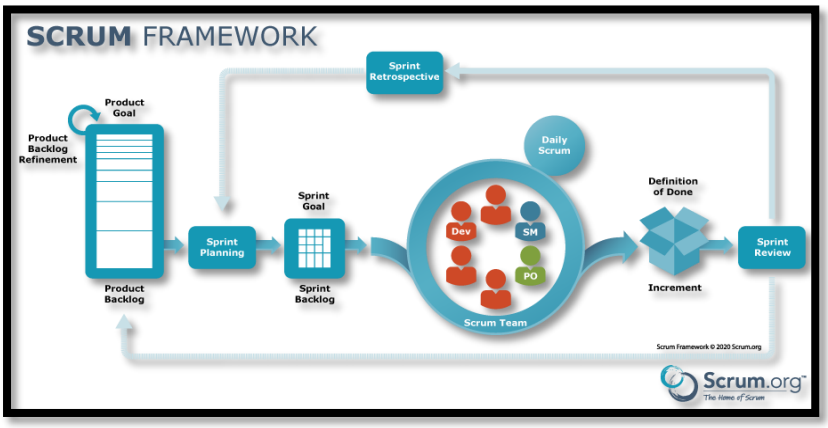


Figure 1. Research Flow Using Scrum Framework

Statistical analysis

The research data were analyzed using descriptive qualitative analysis techniques to obtain a comprehensive understanding of the implementation of the Scrum framework in developing a website-based move-in service. Qualitative analysis was considered appropriate because it enables the researcher to interpret social phenomena, organizational processes, and user needs within the context of public service innovation. The analysis process followed three main stages: data reduction, data display, and conclusion drawing. Data reduction was conducted by selecting, classifying, and simplifying information obtained from interviews, observations, and documentation based on the research objectives. Subsequently, the data were systematically presented in the form of narratives, matrices, and tables to facilitate interpretation and identification of recurring patterns. The final stage involved drawing conclusions and verifying findings throughout the research process to ensure consistency and validity of the results.

To strengthen the analysis, data triangulation was applied by comparing information from different sources, including service officials, operators, technical staff, and community users. Method triangulation was also used through the combination of interviews, direct observation, and document review. This process was intended to improve data credibility and minimize subjective bias in interpreting research findings.

In addition, prototype evaluation was conducted through limited user testing involving selected participants. The evaluation focused on several indicators, namely ease of use, interface clarity, accessibility, feature suitability, responsiveness, and the perceived usefulness of the system in supporting move-in administrative services. User responses were then tabulated and presented descriptively in percentages to illustrate the level of acceptance and satisfaction with the developed prototype.

The analytical approach was also aligned with the iterative principles of Agile and Scrum, where feedback from each evaluation cycle was used as input for subsequent improvements. Therefore, the analysis did not only examine the final prototype, but also assessed the effectiveness of each sprint in addressing user requirements and organizational needs (Adriana N Dugbartey & Olalekan Kehinde, 2025; Choetkiertikul et al., 2025; Werewka & Spiechowicz, 2017).

Overall, this analytical framework was used to provide a thorough overview of the effectiveness, adaptability, and practicality of implementing the Scrum framework in developing a website-based move-in service within a local government environment.

FINDING AND DISCUSSION

This study resulted in the development of a web-based prototype for move-in services using the Scrum framework within the Agile methodology at the Department of Population and Civil Registration of Lamongan Regency. The primary findings indicate that the previous service system was focused on providing one-way service information and had not yet fully digitalized the administrative processes. Consequently, citizens were required to visit the service office to submit documents, complete verification, and wait for manual processing. This situation aligns with findings that manual public services often lead to long queues, delays, and administrative errors.

From observations and interviews, the community expressed the need for a system that was accessible online, simple, fast, and transparent. From the organizational perspective, service officers required a system that could facilitate document verification, data recording, and application status monitoring. These needs were translated into a product backlog as the foundation for prototype development using Scrum.

Requirement Analysis (Sprint 1)

The initial phase of development was carried out through user requirement analysis to identify the key issues in the move-in service. Based on the interview results, analyzed using NVivo 15, it was found that the service process was still manual and not yet integrated digitally, which caused delays

and limited information access for the public. The analysis results indicated that the main user needs included ease in applying for services, clear process flows, and the ability to track application status in real-time.

These findings revealed that the primary problems were not only in administrative processes but also in the lack of a system capable of effectively meeting user needs. Data analysis was performed through coding and theme categorization using NVivo 15 to identify patterns in user needs, as shown in Figure 1. The visualization results demonstrated a dominance of themes related to service efficiency and process transparency, which formed the basis for system requirements formulation.



Figure 2: Results of User Need Analysis Using NVivo 15

Based on these findings, the system requirements were then formulated in the form of a feature list to be developed in the next phase. This shows that the requirement analysis process was crucial to ensure that the developed system would align with user needs and significantly improve service quality.

Product Backlog (System Planning)

Based on the needs analysis from the previous phase, the system features were formulated into a product backlog, which served as the basis for service development planning. The product backlog consisted of a prioritized list of system requirements based on urgency and relevance to the users' issues.

The backlog revealed that the main priority features included online application submission, document upload, and status tracking. This prioritization was based on user needs that emphasized process efficiency and service transparency. Conceptually, the prioritization of features that are user-centered showed that the system was designed with the goal of enhancing service quality.

Table 1. Product Backlog of Web-Based Move-In Service

User Story ID	Task Name	Task Owner	Status	Priorities	Due Date	Estimated Efforts
US-01	Submission of move-in application online	Citizen	In Progress	High	23/12/2025	2 days
US-02	Submission of required documents for move-in	Citizen	In Progress	High	24/12/2025	2 days
US-03	Information about the move-in service	Citizen	Completed	Medium	21/12/2025	1 day
US-04	Monitoring status of move-in application	Citizen	Pending Review	Medium	25/12/2025	1 day
US-05	Verification of move-in application	Officer	In Progress	High	25/12/2025	2 days
US-06	Data collection for move-in process	Officer	Not Started	Medium	27/12/2025	1.5 days
US-07	Data entry for move-in application verification	System	Not Started	Medium	27/12/2025	1.5 days
US-08	Features and security of applicant's data	System	Pending Review	High	26/12/2025	1.5 days

The product backlog also served as a guide for task distribution during each sprint, ensuring that the development process was structured and directed. This highlights that the use of a backlog

not only helped prioritize features but also acted as a project management tool that supported the system's development efficiency.

System Design (Sprint 2)

The next phase focused on system design, where the prioritized needs in the product backlog were translated into system workflows and user-friendly interface layouts. This stage aimed to design a system that minimized user obstacles, ensured clarity in service processes, and allowed easy access via digital devices.

The service process flow was designed starting from user registration, form filling, document upload, verification by officers, and monitoring application status. This workflow aimed to reduce the administrative steps previously done manually. The system flowchart is depicted in

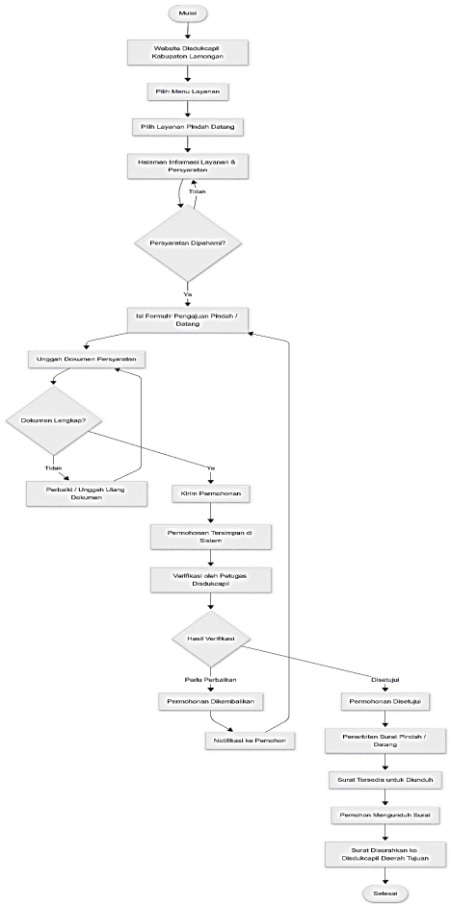


Figure 3. Service Flowchart for Web-Based Move-In Service

Additionally, wireframes for key pages such as the Login page, Homepage, Service Menu, and Status Tracking were created to ensure the layout was intuitive for users before proceeding with further development. The interface design samples are shown below:



Figure 4. Wireframe of Login Page for Move-In Service



Figure 5. Wireframe of Homepage for Move-In Service



Figure 6. Wireframe of Service Menu for Move-In Service

The results from the design phase showed that a simple and structured system layout improved usability. A clear interface reduced user barriers and accelerated interaction with the system. This finding emphasizes the importance of design quality in the successful implementation of digital public services.

Prototype Development (Sprint 3)

Prototype development was carried out based on the system design and prioritized features established in the previous phase. This phase focused on implementing the core features of the move-in service: user registration, online application submission, document upload, and status tracking.

The development process was iterative, allowing for testing and adjustments to meet user needs. The results showed that the prototype successfully integrated previously manual processes into a web-based system. Users could now submit applications without visiting the service office, while officers could verify data in a more structured manner through the system.

The Homepage, Service Menu, and Status Tracking pages were fully developed in this sprint, and their prototypes are shown below:



Figure 7. Prototype of Homepage for Move-In Service



Figure 8. Prototype of Service Menu for Move-In Service

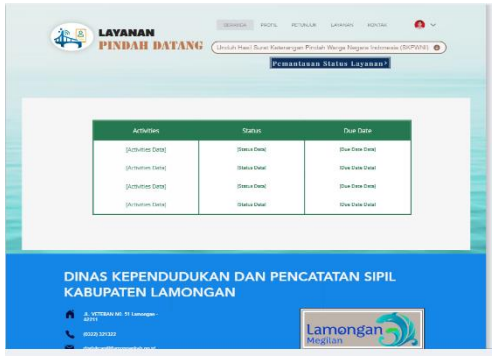


Figure 9. Prototype of Status Tracking Page for Move-In Service

Moreover, the Status Tracking feature enabled users to monitor their application progress in real-time, adding transparency to the service process and reducing uncertainty. The status tracking feature display is shown in Figure 9. Status Tracking Feature Display.

Scientifically, the results of the development show that digitalizing the service simplified administrative procedures, accelerated service flow, and increased public accessibility to the service. These findings confirm that the web-based system developed through Scrum can be an effective solution for improving population administration services at the local level.

System Testing

The next phase involved system testing to ensure that all features of the prototype functioned as designed. Black box testing was employed, which focuses on the system's input, processing, and output without examining the internal code structure.

The test subjects included the user registration feature, system login, move-in service application submission, document upload, and status tracking. The results showed that all key features were functioning as expected, based on the scenarios defined in the test plan. The summary of the system test results is shown in Table 2. Functional Test Results for the Move-In Service Prototype.

Table 2. Functional Test Results for the Move-In Service Prototype

Feature	Scenario	Result
Login	Valid input	Success
Application	Complete data	Success
Document upload	File matches	Success
Tracking	Valid number	Success

Based on the test results, the prototype met the basic functional requirements for the web-based move-in service. These findings indicate that the iterative development process, along with continuous evaluation, resulted in a stable system that fulfilled user needs. Conceptually, the success of the functional testing demonstrates that system quality is influenced by clear initial requirements, structured design, and ongoing evaluations throughout the development process.

Thus, the resulting prototype is viable for further development and could serve as a model for future population administration services at the Department of Population and Civil Registration of Lamongan Regency.

CONCLUSIONS

This study concludes that the implementation of the Scrum framework within the Agile methodology was effective in developing a website-based move-in service at the Department of Population and Civil Registration of Lamongan Regency. The use of Scrum enabled the development process to be carried out systematically, collaboratively, and adaptively through iterative sprint cycles. This approach allowed system improvements to be made continuously based on stakeholder feedback and user needs.

The developed prototype successfully provided several important service features, including online application forms, document upload facilities, application status tracking, and service notifications. These features were able to simplify conventional administrative procedures, reduce queues, improve transparency, and increase public accessibility to population administration services.

The findings also indicate that digital transformation in public services is not only related to technological adoption, but also to organizational readiness, service responsiveness, and continuous innovation. Therefore, the Scrum framework can be considered an appropriate alternative model for developing digital public services in local government institutions.

However, this study was limited to prototype development and limited user testing. Future studies are recommended to conduct full-scale system implementation, broader usability testing, integration with population databases, and evaluation of long-term service effectiveness. Overall, the resulting prototype has strong potential to support the modernization of population administration services that are more efficient, transparent, and citizen-oriented.

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