

Development of a Web-Based Employee Attendance Information System Using Agile Method

Hilda Nur Apriliani¹, Bayu Pamungkas²

^{1,2}Information System, Indonesian Institute of Education, Indonesia
hildanurapriliani20@gmail.com

Article Info

Article history:

Accepted January 2026

Revised February 2026

Approved February 2026

Published March 2026

ABSTRACT

Employee attendance plays a crucial role in human resource management; however, at Perumda Tirta Intan Garut, the attendance process is still conducted manually, leading to recording errors, delays in data recapitulation, and difficulties in monitoring employee discipline. This study aims to develop a web-based employee attendance information system using the Agile Development method to improve the efficiency, accuracy, and effectiveness of attendance management. The research employs a Research and Development (R&D) approach combined with Agile Methodology, allowing iterative system development and continuous user feedback. System modeling is carried out using Unified Modeling Language (UML), including use case, activity, sequence, and class diagrams. The system is implemented using the Laravel framework and a MySQL database, while functional testing is conducted using Black Box Testing. The results indicate that the developed system enables real-time attendance recording, reduces data entry errors, accelerates attendance report generation, and improves user satisfaction. This study contributes practically by providing an adaptive and efficient web-based attendance system and methodologically by demonstrating the effectiveness of Agile Development in information system development within public service organizations.

Keywords: Agile Development; Employee Attendance System; Human Resource Management; Web-Based Information System.

INTRODUCTION

Employee attendance is a crucial component of human resource management, as it directly affects employee discipline, productivity, and overall organizational efficiency [1]. In many public service organizations, attendance data still plays a vital role in evaluating employee performance and supporting administrative decision-making. Perumda Tirta Intan Garut, a regional public company responsible for clean water services in Garut Regency, West Java, currently implements a manual attendance system using attendance books. This manual process often leads to data recording errors, delays in attendance recapitulation, and difficulties in generating accurate attendance reports.

The utilization of information technology through a web-based information system has become a widely adopted solution to overcome these limitations [2]. A web-based employee attendance system enables real-time attendance recording, centralized data storage, and easier access to attendance information for management. Such systems are expected to enhance data accuracy, improve monitoring of employee discipline, and streamline administrative processes compared to conventional manual methods.

This study aims to develop a web-based employee attendance information system using the Agile Development method to address the challenges of manual attendance management at Perumda Tirta Intan Garut. The Agile approach is selected due to its flexibility, iterative development process, and strong emphasis on user involvement, allowing the system to adapt effectively to changing user requirements. Through this approach, the developed system is expected to improve the efficiency of personnel administration, minimize input errors, and support faster and more accurate data-driven decision-making.

The scope of this research includes daily attendance recording, leave and permit management, and attendance report generation. The system is designed for two primary user roles, namely administrators and employees, and is implemented specifically at Perumda Tirta Intan Garut, with the potential to be applied in other regional institutions facing similar attendance management issues.

The development of this system is supported by modern information system adoption theory proposed by Al-Emran and Shaalan (2022), which emphasizes that system usability, technological reliability, and data accuracy are key factors influencing successful system implementation. A web-based system with a simple, responsive interface and real-time data processing capabilities is therefore expected to improve organizational performance and the quality of administrative information. In addition, the selection of appropriate web development technologies plays an important role in ensuring system reliability and scalability. Recent studies highlight that modern programming languages and frameworks emphasize performance, security, and maintainability to support organizational growth and long-term system use (Chandrakant & Sangle, 2021). The use of the Laravel framework combined with a MySQL database in this study supports structured system development, stable data management, and efficient system maintenance.

The main contribution of this research lies in the development and implementation of a web-based employee attendance information system using the Agile Development method in a public service organization. This study contributes practically by providing an adaptive and efficient attendance management solution and contributes methodologically by demonstrating the applicability of Agile Development in real-world public sector information system development.

METHOD

This study employs a Research and Development (R&D) method combined with an Agile Development approach to produce a web-based employee attendance information system that is efficient, adaptive, and aligned with user needs. The R&D method is used because this research focuses on developing a functional

product rather than solely analyzing existing phenomena. According to Long et al. (2020), R&D emphasizes systematic stages of product development, validation, and evaluation to ensure that the resulting system is feasible and applicable in real-world environments. In this study, the R&D approach allows continuous refinement of the system based on findings obtained during the development and testing phases.

The system development process is carried out iteratively using the Agile Development method, which emphasizes flexibility, incremental feature development, and active user involvement. Agile is selected to address the dynamic nature of user requirements in attendance management systems, where administrative needs and operational procedures may change during development. As stated by Rigby, Sutherland, and Takeuchi (2019), Agile focuses on short development cycles, continuous feedback, and close collaboration between developers and users to ensure that the system meets both functional and non-functional requirements. In this research, the Agile method is adapted into several iterative stages, including requirement identification, system design, implementation, testing, and evaluation. At the beginning of each iteration, user requirements are gathered through direct communication with administrators and employees to identify necessary features such as attendance recording, leave management, and report generation. The system is then designed using Unified Modeling Language (UML) to visualize system structure and workflows. Implementation is conducted incrementally using the Laravel framework and a MySQL database, allowing new features to be added and refined in each iteration.

Each iteration produces a functional system increment that is tested using Black Box Testing to verify that system functionalities operate according to defined requirements. User feedback obtained during the testing and evaluation stages is used as the basis for improving subsequent iterations. This iterative and feedback-driven process ensures that the final system is not only technically functional but also aligned with actual user needs and organizational workflows at Perumda Tirta Intan Garut.



Figure 1. Stages of the Agile Method

Source : Agus Sumanto Metode Pengembangan Agile(2025) [8]

RESULTS AND DISCUSSION

The web-based employee attendance information system developed in this study is designed to address key issues identified in the previous manual attendance process at Perumda Tirta Intan Garut. The primary problems include data recording errors, delays in attendance recapitulation, and difficulties in generating accurate attendance reports. The results presented in this section are obtained from system testing and user evaluation conducted during the Agile Development process.

Real-Time Attendance Recording

The developed system enables employees to record their attendance through a web-based interface, allowing attendance data to be stored in real time. Based on user testing, approximately 95% of employees indicated a preference for the web-based attendance system compared to the previous manual method. This preference is primarily due to the ease of use, faster recording process, and immediate confirmation of attendance submission.

Data Accuracy Improvement

The implementation of a centralized database significantly improves the accuracy of attendance data. Before system implementation, manual attendance records showed an average error rate of approximately 10%, mainly due to illegible handwriting and incorrect data entry. After system implementation, the error rate decreased to less than 1% as a result of automated data validation and standardized input formats within the system.

Efficiency of Attendance Data Management

The Agile Development approach facilitated rapid system iterations and feature refinement based on user feedback. One notable improvement is the efficiency of attendance report generation. Previously, administrative staff required several hours to compile attendance reports manually. With the implemented system, report generation can be completed within minutes, thereby reducing administrative workload and improving operational efficiency.

User Satisfaction

User satisfaction was evaluated through post-implementation surveys involving administrators and employees. The results show that approximately 90% of users perceived the system as improving their overall experience in managing attendance activities. Factors contributing to this satisfaction include the system's intuitive interface, clear navigation structure, and easy access to attendance information.

Support for Managerial Decision-Making

The availability of accurate and centralized attendance data supports faster and more informed managerial decision-making. Real-time reporting features allow management to monitor attendance patterns, identify irregularities, and respond promptly to attendance-related issues.

Discussion

The results demonstrate that the implementation of a web-based employee attendance information system effectively addresses the limitations of the manual attendance process previously used at Perumda Tirta Intan Garut. The reduction in data recording errors and the significant improvement in report generation efficiency indicate that digital attendance systems provide tangible operational benefits for public service organizations.

The use of the Agile Development method proved to be effective in this study, as it enabled continuous user involvement throughout the development process. Regular feedback from administrators and employees allowed the system to be refined iteratively, ensuring alignment with actual organizational workflows. This finding supports previous studies that highlight Agile Development as a suitable approach for information system development in dynamic organizational environments.

The application of Unified Modeling Language (UML) facilitated clear visualization of system processes and user interactions, which contributed to structured system design and reduced implementation errors. Furthermore, the use of the Laravel framework combined with a MySQL database provided a stable, scalable, and maintainable technical foundation for the system. Overall, the findings confirm that integrating Agile Development with web-based attendance system design enhances system usability, data accuracy, and administrative efficiency. These results align with information system adoption theories that emphasize usability and reliability as key factors in successful system implementation.

Use Case Diagrams

Here is the picture is Use Case Diagrams.

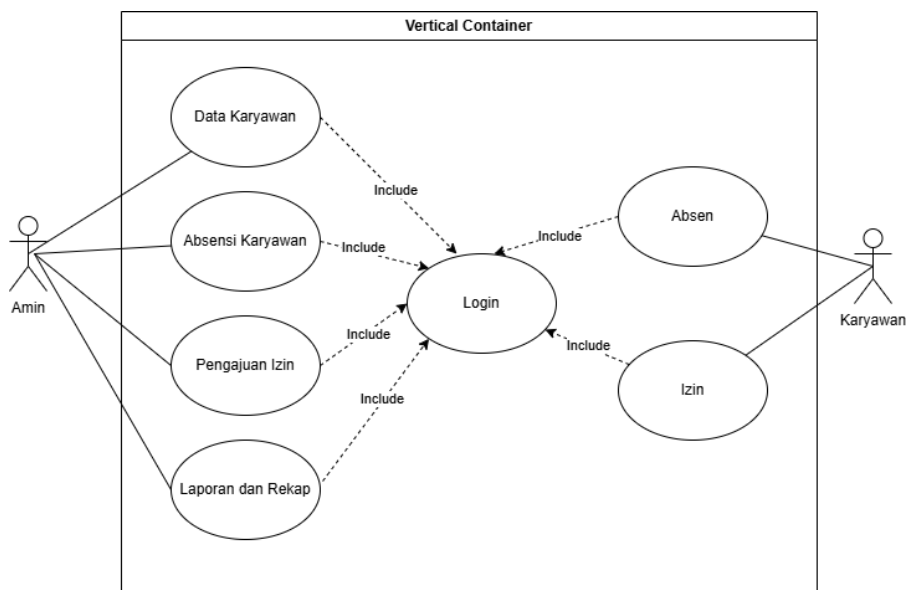


Figure 2. Use Case Diagrams

Activity Diagrams

Here is the picture is activity diagram.

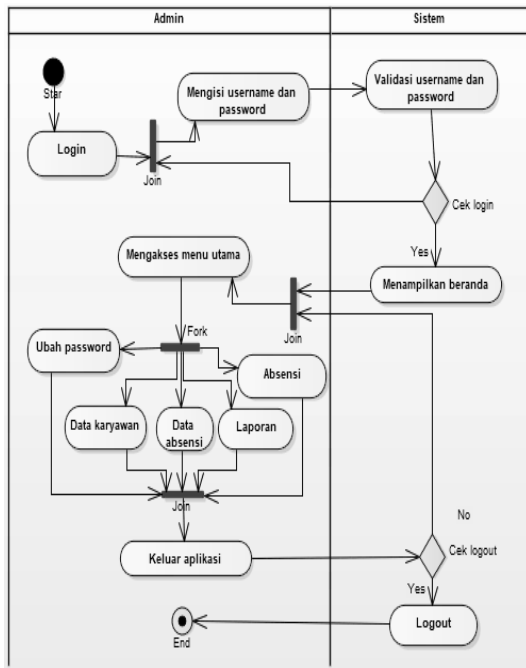


Figure 3. Activity Diagrams Admin

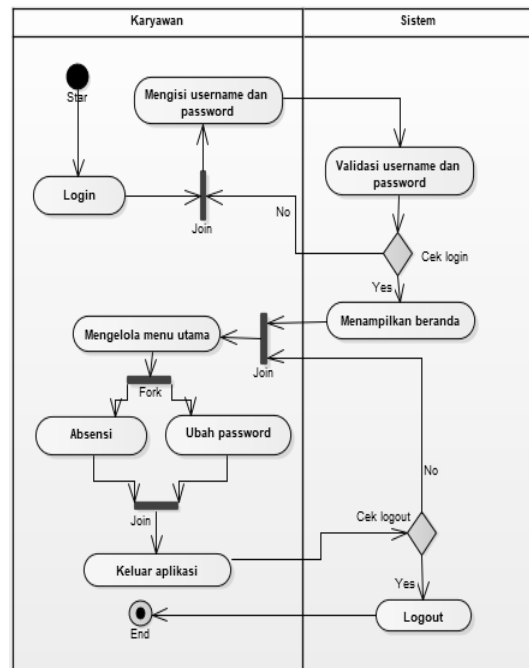


Figure 4. Employee Activity Diagrams

Sequence Diagrams

Here is the picture is sequence diagram.

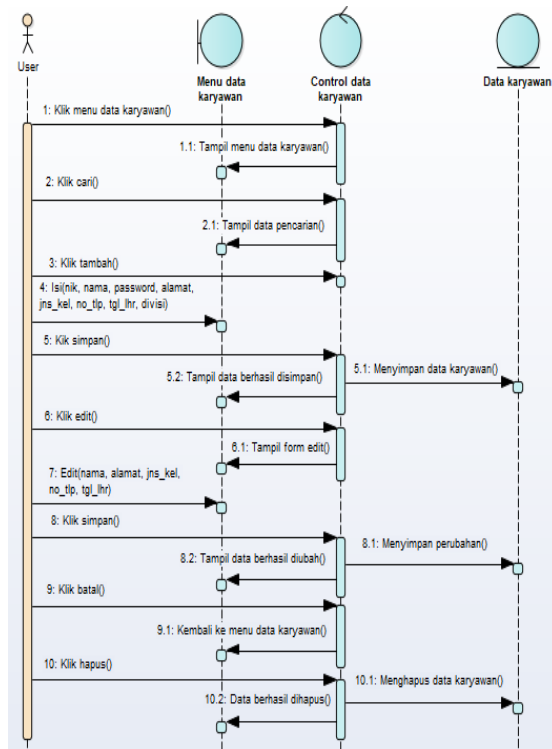


Figure 5. Employee Data Sequence Diagrams

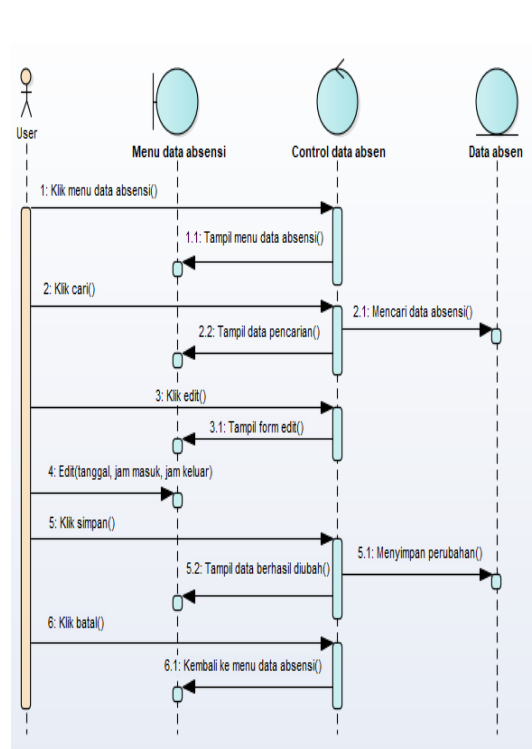


Figure 6. Sequence Diagrams Absent

Application Program View

The application program interface for the attendance information system is designed with a simple, responsive, and user-friendly interface for both admin and employee users. Each page features a consistent layout for easy navigation from the login page to the admin dashboard, employee dashboard, attendance validation page, and more.

1. Admin View

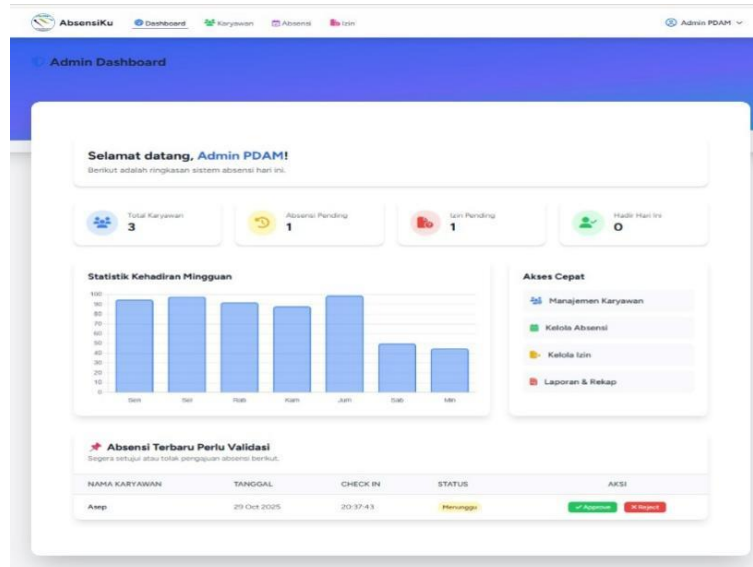


Figure 7. Admin Dashboard Page

Figure 7 illustrates the admin dashboard interface, which serves as the main control center for monitoring employee attendance data, managing system features, and accessing summary information in real time.

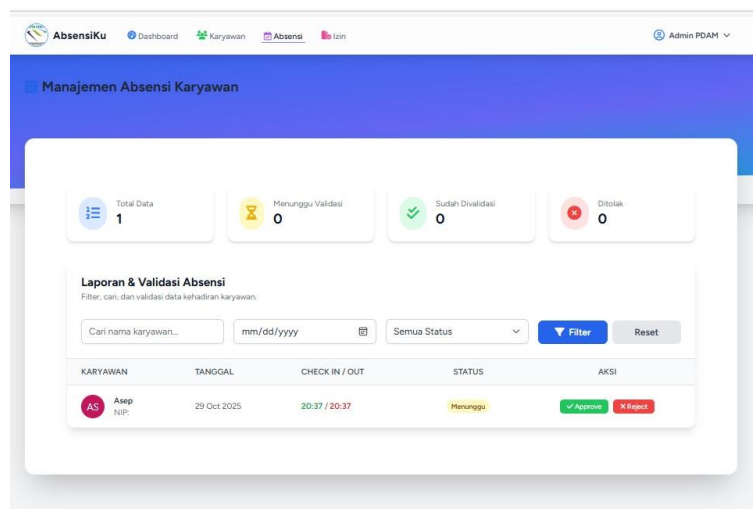


Figure 8. Employee Absence Management Page

Figure 8 presents the employee attendance management page, highlighting the admin’s ability to validate attendance records, manage attendance data, and generate reports efficiently through the web-based system.

2. Employee Dashboard Page

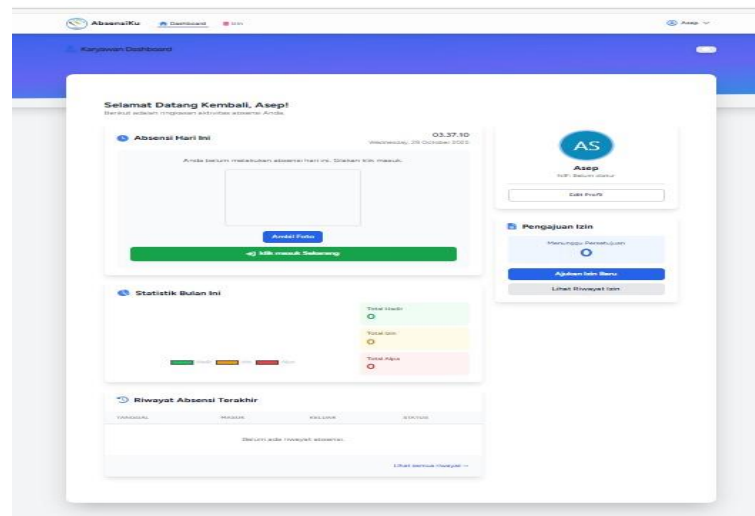


Figure 9. Employee Dashboard Page

Figure 9 shows the employee dashboard interface, providing employees with quick access to attendance information, work schedules, and relevant notifications within the attendance management system.

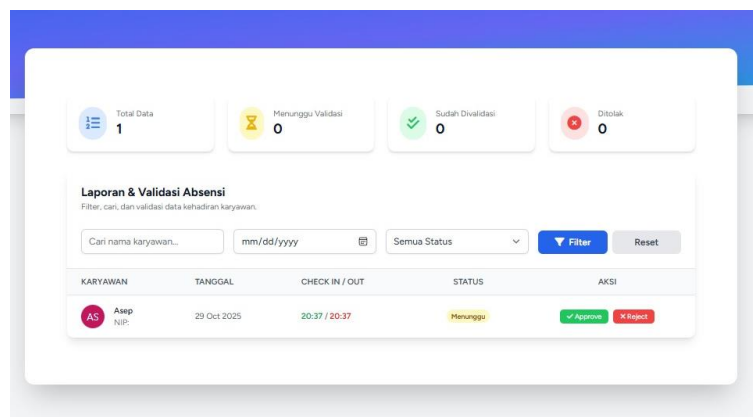


Figure 10. Attendance Page

Figure 10 depicts the attendance recording page, where employees can perform real-time attendance submissions that are automatically stored and processed in the centralized database.

CONCLUSION

Based on the design, development, and testing processes conducted in this study, it can be concluded that the developed web-based employee attendance information system effectively addresses the limitations of the previously used manual attendance process at Perumda Tirta Intan Garut. The system enables real-time attendance recording, improves data accuracy through centralized data management, and enhances administrative efficiency in attendance validation and report generation.

The application of the Agile Development approach, supported by the Laravel framework and MySQL database, allows the system to be developed in a flexible and adaptive manner. Continuous user feedback during iterative development ensures that the system aligns with actual organizational needs. In addition, the use of UML modeling provides a clear representation of system structure and workflows, contributing to a more systematic and controlled implementation process.

The main contribution of this study lies in providing a practical implementation of a web-based employee attendance information system using Agile Development within a public service organization. This research demonstrates that Agile-based system development can improve usability, efficiency, and accuracy in attendance management, thereby supporting data-driven decision-making.

Future research may focus on enhancing the system by integrating automated notification features via email or messaging platforms such as WhatsApp to improve user responsiveness. Further development may also include the integration of biometric or geolocation-based attendance mechanisms to increase data validity and security. Additionally, strengthening system security through data encryption, multi-factor authentication, and detailed audit logging is recommended to ensure long-term data protection and system reliability.

BIBLIOGRAPHY

- [1] A. G. Mulia, "Web-Based Attendance Information System at Politeknik Negeri Padang," *Journal of Indonesian Information Technology*, vol. 5, no. 1, pp. 11–17, 2020, doi: 10.30869/jtii.v5i1.519.
- [2] A. Syeah, Y. Samuel, D. A. Pratama, and R. A. Althaaf, "Design of a Web-Based Employee Attendance Information System Using Agile Development Method," vol. 2, no. 9, pp. 1739–1746, 2025.
- [3] R. Pratama, "Design and Implementation of a Web-Based Employee Leave Management System Using Agile Approach," *Journal of Informatics and Applied Electrical Engineering*, vol. 12, no. 3, 2024, doi: 10.23960/jitet.v12i3.4527.
- [4] N. A. Hidayah and N. M. Asnadi, "Application of Agile Method in Project Management: A Systematic Literature Review," *Journal of Software Engineering*, vol. 6, no. 1, pp. 43–53, 2024, doi: 10.32520/jupel.v6i1.2858.
- [5] R. Wandri, M. Fadhilla, P. R. Setiawan, S. Daulay, A. Hanafiah, and D. F. Qurniawan, "Optimizing School Data Management Through a Web-Based Information System Using Agile Approach," *Sainstek*, vol. 13, no. 1, pp. 157–165, 2025, doi: 10.35583/js.v13i1.327.
- [6] D. Abdurahman, M. Sidiq, and R. D. Supriatman, "Design of a Web-Based Student Admission Information System Using Agile Method," *Journal of Galuh Information Systems*, vol. 1, no. 2, pp. 32–39, 2025, doi: 10.25157/jmsig.v1i2.4207.
- [7] R. Noviranda and A. Saleh, "Design and Development of an Android-Based Student Admission Application Using Agile Method," *Zona Komputer*, vol. 2, no. 2, pp. 69–83, 2023. [Online]. Available: <https://ejournal.abivasi.id/index.php/SmartAI>

- [8] I. Mussyafa, "Agile Development Method: Definition, Stages, and Advantages." [Online]. Available: <https://agus-hermanto.com/blog/detail/metode-pengembangan-agile-pengertian-tahapan-dan-keuntungan>
- [9] M. Al-Emran and K. Shaalan, *Recent Advances in Information Systems and Technologies: Factors Influencing System Adoption in Organizations*. Springer, 2022.
- [10] T. Long, W. Zhao, and J. Chen, "Research and Development Methodology for Information System Design: A Modern Perspective," *Journal of Information Technology Research*, vol. 13, no. 4, 2020.