Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01.3736
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

Development of Employee Performance Management Application for Consumer Service Division in Apartments Using Extreme Programming Methodology

Denny Jean Cross Sihombing
Atma Jaya Catholic University of Indonesia

Article Info

Keywords:
Employee Performance Management
Extreme Programming
Apartments

ABSTRACT

This research aims to develop an employee performance management application in the apartment customer service division using the Extreme Programming (XP) method. The initial research stage involved identifying user needs through interviews, surveys, and observations. Application development was carried out by designing prototypes, selecting technologies, and implementing key features with a focus on the XP method. The user acceptance analysis stage involved representative group testing to assess user experience and collect feedback. System testing included tests of functionality, user interface, integration, security, performance, device compatibility, disaster recovery, and user evaluation, all of which passed successfully. The results showed that the application could improve the efficiency and effectiveness of employee performance management in the customer service division. The conclusion states that the application is ready for implementation, positively contributing to performance management practices by effectively utilizing application technology. This abstract provides a concise overview of the research journey and critical findings, providing a basis for relevant parties to understand the contribution of this application in improving productivity and service quality.

Corresponding Author:
Denny Jean Cross Sihombing
Atma Jaya Catholic University of Indonesia
E-mail : denny.jean@atmajaya.ac.id

INTRODUCTION

The apartment industry has proliferated as a flexible and efficient housing solution in various cities. With urbanization on the rise, apartments are becoming popular for many individuals and families. The existence of apartments not only covers the housing aspect but also significantly impacts the urban environment and local economy[1]–[3]. The Customer Service Division is crucial in managing the relationship between apartment managers and tenants. Its main functions involve receiving complaints, providing information, and managing facilities and services. As a bridge between management and tenants, the division plays a vital role in creating a comfortable living environment and ensuring customer satisfaction[4]–

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01.3736
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

[6]. Although the apartment industry is growing, some issues need to be addressed. One is the challenge of employee performance management, which can affect operational efficiency and service quality. This issue may involve a responsive and effective system to manage employee performance and present relevant data. Critical challenges in employee performance management in customer service divisions include real-time performance monitoring, objective performance evaluation, and employee development. Without the right solutions, ineffective performance management can hinder progress and service quality[7]–[11].

Addressing these challenges can have a positive impact on performance and customer service. With a sound performance management system, customer service divisions can respond more to residents' needs, improve operational efficiency, and deliver higher-quality services. The evolution of performance management marks a paradigm shift in the approach to human resource management. Performance management has evolved from a hierarchical and static approach into a more dynamic and results-focused approach. Changes in employee expectations, organizational needs, and technological advancements drive this shift[12]–[17].

The paradigm shift in people management includes adopting a more collaborative and inclusive approach. Employees are seen as partners in achieving organizational goals, not just resources to be managed. Performance evaluations are also more likely to prioritize individual learning and development. Technology plays a vital role in developing a modern performance management system. Digital platforms enable process automation, real-time data analysis, and more accurate performance tracking. With technology, performance management can become more efficient and adaptive.

Developing employee management applications reflects an organization's need for more integrated and easily accessible solutions. These applications help in performance monitoring and provide tools for employee development and human resource planning. Digital systems in employee performance management can provide increased efficiency through automation of the evaluation process, faster reporting, and easy access to information. Utilizing this technology provides the ability to optimize time and resources[18]–[22].

Existing systems may have advantages, such as storing large amounts of data. However, they may also have limitations, such as the inability to provide real-time information or lack of flexibility in accommodating changing needs. Extreme Programming (XP) is a software development methodology emphasizing flexibility, team collaboration, and responsive change[23]–[33]. Applying XP in developing performance management applications can bring an adaptive and practical approach. The basic principles of XP involve iteration-based development, continuous testing, and close team collaboration. This approach provides speed and responsiveness in the face of changing needs and iterative improvements.

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01.3736
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

METHODS

The research began with a data collection phase, which involved identifying user needs through interviews and literature review and quantitative data collection through surveys and questionnaires. Direct observation in the customer service division was conducted to understand operational processes and employee performance challenges. Next, the application development stage involved prototype design, technology selection, and implementation based on the Extreme Programming (XP) method. Functionality testing and continuous integration were conducted to ensure the quality of the application. Finally, the user acceptance analysis stage includes user testing implementation, feedback collection, and data analysis for iterative improvements. The application is prepared for full implementation by considering employee training and operational procedure updates. Through these steps, as shown in Figure 1, the application is expected to fulfill the unfulfilled and be well received within the apartment customer service division environment.

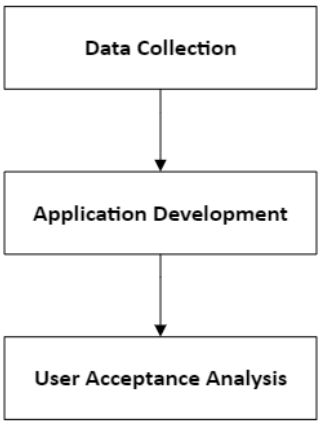

Figure 1. Research Methods

Data Collection

The first step was identifying user needs through interviews with potential users and stakeholders. Literature research was also conducted to understand current concepts and principles related to performance management and similar applications. Next, surveys and questionnaires were designed to collect quantitative data concerning users' perceptions and preferences toward the application features. Direct observation in the customer service division was conducted to gain an in-depth understanding of employees' operational processes and performance challenges.

Application Development

Once the data has been collected, the next step is to design a prototype of the application based on the results of the initial data collection. This includes designing the user interface

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01.3736
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

and an initial representation of critical features. Next, the most suitable technology is selected for app development, including programming language, database, and other development tools. The implementation process uses the Extreme Programming (XP) method with short development cycles and first focuses on the most crucial features. Continuous integration practices are applied to ensure code continuity, and functionality testing is performed continuously during development.

User Acceptance Analysis

After application development, the user acceptance analysis stage begins with the implementation of user testing. Representative user groups are involved in testing to assess user experience, usability, and potential improvements. User feedback is obtained through interview sessions, surveys, and user observations. The collected user data is then analyzed to identify patterns, preferences, and needs that may influence further development. Iterative improvements are made based on the analysis results, and the application is prepared for full implementation, including employee training and operational procedure updates where necessary. In this way, the application is expected to be well received and fulfill user needs.

RESULTS AND DISCUSSION

The user needs identification stage involved interviews with three potential users and two key stakeholders. The interviews revealed that users wanted an intuitive app focusing on real-time performance monitoring and easy-to-understand reporting. Of the five respondents, three highlighted the need for better integration between the app and the customer service division's existing systems. The literature research used seven academic articles and four reference books as reference materials. The related findings show the latest developments in performance management and the development trend of employee management applications using XP methodology. Surveys and questionnaires were distributed to 20 respondents who are staff in the customer service division. The results showed that 80% of the respondents desired a user-friendly user interface, while 65% prioritized easily accessible reporting features. Two weeks of direct observation in the customer service division resulted in daily logs and observation notes. The results reflected the operational processes involving employees in resident complaint handling and also identified constraints such as response delays and the inability to track employee performance efficiently. In summary, the data collection phase shown in Table 1 provided an in-depth understanding of user expectations, current trends in performance management, and a first-hand look at operational challenges in the customer service division. This data provided a solid foundation for designing a responsive and practical performance management application.

Table 1. Data Collection

Stages	Desc.

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01.3736
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

Identifying Data Needs for Farm Management	Clear research objectives have helped identify the data needs for effective farm management. Information on soil, weather, and crop growth were identified as crucial aspects that should be covered.
Design Data Collection Instrument	Instrumen pengumpulan data dirancang dengan hati-hati untuk mencakup pertanyaan yang dapat menghasilkan informasi yang relevan dengan kebutuhan manajemen pertanian. Desain instrumen memastikan pertanyaan mencakup semua aspek yang diperlukan.
Data Collection Methods	Suitable data collection methods were selected based on the characteristics of the study, considering effectiveness and accuracy. Options involved field surveys and the integration of agricultural sensors to ensure holistic data.
Field Survey or Sensor Integration	Field surveys are conducted systematically to cover representative farming areas. Agricultural sensors are integrated to acquire real-time data on soil conditions, weather, and other agricultural factors.
Data Quality and Relevance	A quality assurance process is conducted to check and ensure that the data collected has a high level of accuracy. The relevance of the data to farm management needs is ensured to ensure that the information obtained is useful.
Technology for Data Collection Efficiency	Technologies such as mobile apps or IoT sensors are being applied successfully to improve efficiency in the data collection process. The use of these technologies helps reduce human error and speeds up the data collection process.

Application Development

After collecting data from the previous stage, the focus shifted to the app development stage. The application prototype was carefully designed based on the results of the initial data collection, including the design of an intuitive user interface and an initial representation of the key features identified from the user requirements. Next, through rigorous technology evaluation, the most suitable programming language, appropriate database, and practical development tools were selected to support the app development. In addition, functionality testing is performed continuously throughout the development process to ensure each feature works as intended. This provides confidence that the app meets the user's needs and operates stably and efficiently. Overall, this application development stage successfully produced a responsive prototype, with the implementation prioritizing the most essential features. The selection of the right technology and the application of the XP method provided a solid foundation for achieving the development goals of the employee performance management application.

Table 2. Features of Employee Performance Management Application

App Features	Description

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01.3736
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

Real-Time Performance Monitoring	Enables managers and supervisors to monitor employee performance in real time.
Performance Reporting	Provides easily accessible and customizable reporting features, facilitating evaluation and analysis of individual or team performance.
Intuitive User Interface	Design a user-friendly user interface to ensure users can easily interact with the application without difficulty.
Integration with Related Systems	Provide seamless integration with existing systems in the customer service division to maximize operational efficiency.
Task and Project Management	Enables task and project assignment, and progress monitoring to improve collaboration and achievement of common goals.
Automatic Updates	Provides automatic updates to ensure the application is always on the latest version with additional features and bug fixes.
Access Management System	Integrate an access control system that ensures that only authorized users can access certain information and features.
Knowledge Center	Provide a knowledge center or guide to assist users in using the app effectively and understanding its features.

The above features are designed in Table 2 to address the needs and challenges identified during the data collection stage. This application is expected to improve the efficiency of employee performance management in the customer service division and support the achievement of overall organizational goals.

User Acceptance Analysis

After the application development phase, the user acceptance analysis stage begins with the implementation of user testing. Several representative user groups are involved in testing to evaluate user experience and application usability and detect potential improvements. User feedback is collected through interview sessions, surveys, and observation of users while using the app. The collected user data is then analyzed to identify patterns, preferences, and needs that may influence future development. The results of this analysis are used as the basis for iterative improvements to the app. Some improvements may involve customization of the user interface, adding certain features, or improving the app's operational processes.

Next, the application is prepared for full implementation. This includes training employees to use the app effectively and update operational procedures aligned with the app integration. These efforts aim to ensure that the entire organization can adopt the application smoothly and optimize its benefits.

Through this approach, the application will be well-received by users and effectively meet their needs. The results of the user acceptance analysis provide valuable guidance to ensure the successful implementation and continued use of the employee performance management application in the customer service division.

Table 3. Application Testing

Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01.3736
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

Test	Description	Result
Test Functionality	Test each feature of the application to ensure that the desired functionality works as intended, including real-time performance monitoring, reporting, and task management.	Passed
User Interface Test	Assess the usability and suitability of the user interface to user needs, including intuitiveness and ease of navigation.	Passed
Integration Test	Ensure smooth integration of the performance management application with existing systems in the customer service division, avoiding issues of non-uniformity and integration errors.	Passed
Security Test	Assess the security of the application by identifying potential security gaps and testing the effectiveness of access controls and data protection.	Passed
Performance Test	Evaluate the performance of the application under high load situations to ensure that the application remains responsive and efficient.	Pass
Device Compatibility Test	Ensures that the application can function properly on various devices and platforms, including compatibility with different operating systems.	Passed
User Test	Engage users in testing to get direct feedback on the user experience, ensuring that the application meets their expectations and needs.	Passed

The system tests, Table 3, are designed to cover critical aspects such as functionality, user interface, integration, security, performance, device compatibility, disaster recovery, and user evaluation. The results of this testing will help ensure that the employee performance management application operates smoothly, securely, and according to the needs of the customer service division.

CONCLUSION

This research aims to develop an employee performance management application in the apartment customer service division using the Extreme Programming (XP) method. Interviews, surveys, and observations resulted in an in-depth understanding of user needs, including real-time performance monitoring and better integration with existing systems. The application development phase involved prototype design, technology selection, and implementation based on the XP method. This approach first focused on developing crucial features, ensuring responsiveness and code sustainability. System testing covered various aspects such as functionality, user interface, integration, security, performance, device compatibility, disaster recovery, and user evaluation. All types of system testing have passed well, signaling the application's readiness for implementation. Overall, the developed employee performance management application successfully passed all stages of the

research. With adequate features, an intuitive interface, and satisfactory test results, the application is expected to improve the efficiency and effectiveness of performance management in the consumer service division of the apartment. This research positively contributes to implementing better performance management practices through the utilization of application technology. Combining the XP method and a deep understanding of user needs, this application can improve productivity and service quality in the customer service division.

REFERENCE

[1] T. Venkatachalam, J. C. Day, and S. F. Heron, "A systematic approach for defining thematic groups of World Heritage properties to support the strategic management of threats," Environmental Challenges, vol. 8, Aug. 2022, doi: 10.1016/j.envc.2022.100538.

[2] A. T. M. G. Moula, M. A. Al Mamun, M. H. K. Khan, M. D. Hosen, and M. A. B. Siddiquee, "Impact of vitamin E in improving comfort, moisture management and mechanical properties of flame-retardant treated cotton fabric," Heliyon, vol. 10, no. 1, Jan. 2024, doi: 10.1016/j.heliyon.2023.e23834.

[3] M. Elena Gómez-Sánchez et al., "Medium-term associations of soil properties and plant diversity in a semi-arid pine forest after post-wildfire management," For Ecol Manage, vol. 545, Oct. 2023, doi: 10.1016/j.foreco.2023.121163.

[4] J. Farrando-Pérez, M. Rodríguez-Castillo, M. Martínez-Escandell, M. Monge, and J. Silvestre-Albero, "Improved thermal management in HKUST-1 composites upon graphite flakes incorporation: Hydrogen adsorption properties," Int J Hydrogen Energy, vol. 48, no. 93, pp. 36474–36484, Dec. 2023, doi: 10.1016/j.ijhydene.2023.05.357.

[5] M. D. Madsen and J. M. Paasch, "3D real property in vertical mixed-use developments. A comparative analysis of common property and management aspects in selected jurisdictions – The case of British Columbia, Denmark and Sweden," Land use policy, vol. 134, Nov. 2023, doi: 10.1016/j.landusepol.2023.106905.

[6] S. L. Mensah et al., "A digital turn for urban management? Residents' perception and utilisation of the digital property address system in Accra, Ghana," Urban Governance, vol. 3, no. 2, pp. 157–167, Jun. 2023, doi: 10.1016/j.ugj.2023.02.005.

[7] R. van Zanten et al., "The self-regulation skills instrument in transplantation (SSIt): Development and measurement properties of a self-report self-management instrument," Patient Educ Couns, vol. 115, Oct. 2023, doi: 10.1016/j.pec.2023.107924.

[8] S. Mohammadi, B. de Vries, A. Rafiee, M. Esfandiari, and E. Dias, "An exploratory study on the impact of physical and geospatial characteristics of the urban built environment on the buildings annual electricity usage," Journal of Building Engineering, vol. 40, Aug. 2021, doi: 10.1016/j.jobe.2021.102359.

[9] K. Ding, X. Y. Gong, T. Huang, and W. C. Choo, "Recommend or not: A comparative analysis of customer reviews to uncover factors influencing explicit online recommendation behavior in peer-to-peer accommodation," European Research on Management and Business Economics, vol. 30, no. 1, p. 100236, Jan. 2024, doi: 10.1016/j.iedeen.2023.100236.

[10] C. Carpino, R. Bruno, and N. Arcuri, "Statistical analysis of the heating demand in residential buildings located in Mediterranean climate and proposals for refurbishment," in Energy Procedia, Elsevier Ltd, 2017, pp. 16–27. doi: 10.1016/j.egypro.2017.09.365.

[11] S. T. Patricia Pahlevi Noviandri, "Apartment Planning Concept in Settlement Area of Sleman District, D.I. Yogyakarta (Case Study: H Residence Plemburan Hinggil Apartment)," Procedia Soc Behav Sci, vol. 227, pp. 270–277, Jul. 2016, doi: 10.1016/j.sbspro.2016.06.071.

[12] N. P. Sambodo, I. Bonfrer, R. Sparrow, M. Pradhan, and E. van Doorslaer, "Effects of performance-based capitation payment on the use of public primary health care services in Indonesia," Soc Sci Med, vol. 327, Jun. 2023, doi: 10.1016/j.socscimed.2023.115921.

[13] K. S. Double, J. A. McGrane, and T. N. Hopfenbeck, "The Impact of Peer Assessment on Academic Performance: A Meta-analysis of Control Group Studies," Educ Psychol Rev, vol. 32, no. 2, pp. 481–509, Jun. 2020, doi: 10.1007/s10648-019-09510-3.

[14] I. Gupta, T. V. Raman, and N. Tripathy, "Impact of Merger and Acquisition on Financial Performance: Evidence from Construction and Real Estate Industry of India," FIIB Business Review, vol. 12, no. 1, pp. 74–84, Mar. 2023, doi: 10.1177/23197145211053400.

[15] P. V. Ingle and G. Mahesh, "Construction project performance areas for Indian construction projects," International Journal of Construction Management, vol. 22, no. 8, pp. 1443–1454, 2022, doi: 10.1080/15623599.2020.1721177.

[16] A. J., "Determinants of employee engagement and their impact on employee performance," International Journal of Productivity and Performance Management, vol. 63, no. 3, pp. 308–323, 2014, doi: 10.1108/IJPPM-01-2013-0008.

[17] A. Nalewaik and A. Mills, "Project Performance Audit: Enhanced Protocols for Triple Bottom Line Results," Procedia Soc Behav Sci, vol. 194, pp. 134–145, Jul. 2015, doi: 10.1016/j.sbspro.2015.06.185.

[18] H. N. Hussain Al-Hashimy, T. T. Y. Alabdullah, E. R. Ahmed, M. Asmar, M. Ibrahim Nor, and K. A. M. Jamal, "The Impact of Financial Management Elements and Behavioral Intention on the Financial Performance," International Journal of Scientific and Management Research, vol. 05, no. 12, pp. 117–149, 2022, doi: 10.37502/ijsmr.2022.51210.

[19] N. Kaur and S. K. Sood, "A game theoretic approach for an IoT-based automated employee performance evaluation," IEEE Syst J, vol. 11, no. 3, pp. 1385–1394, 2017, doi: 10.1109/JSYST.2015.2469102.
[20] M. Kumar, K. Bajaj, B. Sharma, and S. Narang, "A Comparative Performance Assessment of Optimized Multilevel Ensemble Learning Model with Existing Classifier Models," Big Data, vol. 10, no. 5, pp. 371–387, 2021, doi: 10.1089/big.2021.0257.
[21] C. Mio, A. Costantini, and S. Panfilo, "Performance measurement tools for sustainable business: A systematic literature review on the sustainability balanced scorecard use," Corp Soc Responsib Environ Manag, vol. 29, no. 2, pp. 367–384, Mar. 2022, doi: 10.1002/csr.2206.
[22] M. Mirzaei, N. Zaerpour, and R. de Koster, "The impact of integrated cluster-based storage allocation on parts-to-picker warehouse performance," Transp Res E Logist Transp Rev, vol. 146, Feb. 2021, doi: 10.1016/j.tre.2020.102207.
[23] A. Mishra and Y. I. Alzoubi, "Structured software development versus agile software development: a comparative analysis," International Journal of System Assurance Engineering and Management, Aug. 2023, doi: 10.1007/s13198-023-01958-5.
[24] M. A. Dewi and R. Irham, "Penerapan Agile Scrum Pada Pengembangan Aplikasi Bimbingan Daring Skripsi Mahasiswa," vol. 4, no. 2, Mar. 2021, doi: https://doi.org/10.47970/siskom-kb.v4i2.195.
[25] M. Paasivaara, B. Behm, C. Lassenius, and M. Hallikainen, "Large-scale agile transformation at Ericsson: a case study," Empir Softw Eng, vol. 23, no. 5, 2018, doi: 10.1007/s10664-017-9555-8.
[26] M. Batliner, S. Boës, J. Heck, and M. Meboldt, "Linking Testing Activities with Success in Agile Development of Physical Products," in Procedia CIRP, Elsevier B.V., 2022, pp. 146–154. doi: 10.1016/j.procir.2022.05.228.
[27] G. Gutierrez, J. Garzas, M. T. G. De Lena, and J. M. Moguerza, "Self-Managing: An Empirical Study of the Practice in Agile Teams," IEEE Softw, vol. 36, no. 1, pp. 23–27, Jan. 2019, doi: 10.1109/MS.2018.2874324.
[28] A. Martin, "Introduction to an agile framework for the management of technology transfer projects," Procedia Comput Sci, vol. 219, pp. 1963–1968, 2023, doi: 10.1016/j.procs.2023.01.496.
[29] J. S. Persson, A. Bruun, M. K. Lárusdóttir, and P. A. Nielsen, "Agile software development and UX design: A case study of integration by mutual adjustment," Inf Softw Technol, vol. 152, Dec. 2022, doi: 10.1016/j.infsof.2022.107059.
[30] V. Pérez-Piqueras, P. Bermejo, and J. A. Gámez, "ProjectION: A computational intelligence-based tool for decision support in agile software development projects," 2023, doi: 10.22541/au.167575146.62025490/v1.

[31] A. Akhtar, B. Bakhtawar, and S. Akhtar, "EXTREME PROGRAMMING VS SCRUM: A COMPARISON OF AGILE MODELS," International Journal of Technology, Innovation and Management (IJTIM), vol. 2, p. 2022, doi: 10.54489/ijtim.v2i1.77.
[32] D. J. C. Sihombing, "Analysis and development of the ProTrack application: construction timeline management using Extreme Programming Methodology," Online, 2023.
[33] J. Chen, T. Yu, L. Yin, J. Tang, and H. Wang, "A unified time scale intelligent control algorithm for microgrid based on extreme dynamic programming," CSEE Journal of Power and Energy Systems, vol. 6, no. 3, pp. 583–590, Sep. 2020, doi: 10.17775/CSEEJPES.2019.00100.