.

Digital Transformation of Resident Services: Quality and Satisfaction Analysis at Andalas Residence

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Article Information	ABSTRACT
	Resident services at Andalas Residence have been relying on traditional methods that often face obstacles such as delays in response, lack of transparency, and difficulties in data management. This article aims to analyze and develop a digital technology-based resident service satisfaction survey system using the waterfall method. This research was conducted by distributing questionnaires to 286 respondents of Andalas Residence residents. The data obtained was analyzed using the Structural Equation Modeling-Partial Least Square (SEM-PLS) statistical method. The results showed that the application of digital transformation not only improved the quality of service but also the overall efficiency of dormitory management.

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1. INTRODUCTION

Digitalization has brought great changes in various aspects of life, including residential management [1]. However, the challenge of providing fast, transparent, and efficient services is still a major problem [2], as faced by Andalas Residence. The manual management system that is still applied often causes delays in handling complaints, data recording errors, and lack of transparency in payment and facility management [3]-[4].

The majority of Andalas Residence residents, who are mostly Andalas University students, complain about the slow response to complaints, complicated administrative

processes, and lack of access to real-time information [5]–[7]. These problems are exacerbated by the difficulty of reporting complaints and cumbersome payment systems. This situation demonstrates the urgent need for digital transformation as a strategic step in improving services [8].

One solution that can be applied is the development of digital information systems and resident satisfaction survey applications [9]. With this application, residents can report complaints, make payments, and provide feedback more easily and quickly. Meanwhile, managers can utilize the collected data to improve service quality on an ongoing basis. Digitally conducted satisfaction surveys also allow residents to provide feedback at any time, while managers can respond to complaints in real-time [10].

The advantages of this system lie in its ability to simplify administrative processes, improve operational efficiency, and create more responsive services. The collected data can be processed directly to produce in-depth analysis, which is useful in strategic decision-making [11]. By utilizing the waterfall method in system development, the process becomes more structured, from requirement identification to implementation and evaluation.

Furthermore, the integration of SEM-PLS (Structural Equation Modeling-Partial Least Squares) method in the survey analysis can provide in-depth insights into residents' needs. This approach allows managers to understand the relationship between various service factors and resident satisfaction levels, so that solutions are more targeted. In addition, this digital system can be a tool to build better communication between residents and managers, creating a comfortable and efficient residential environment [12], [13].

Digital transformation at Andalas Residence is not just a technical change, but a strategic step to provide modern and competitive services. By paying attention to the needs of residents holistically, this innovation is expected to increase residents' trust and satisfaction. In the future, this digital management model can be applied in other residences, both in educational institutions and the private sector. Further development could also include the integration of technologies such as artificial intelligence for predictive analysis, to create more sustainable solutions in property management.

2. RESEARCH METHOD

This research applies the methodology used in the Research and Development (R&D) process for Research to produce an innovative survey system. This research uses the waterfall method which consists of several main stages [14], [15]:
a) Needs analysis by identifying key issues through surveys and tenant interviews.
b) System design by creating an information system prototype based on the identified needs.
c) Implementation by building applications with main features such as complaint reporting, online payments, and automatic notifications.

d) Testing using SEM-PLS to evaluate the relationship between variables and system performance against the functionality and reliability of the system remains relevant [16].
e) Maintenance to provide periodic updates to maintain system performance.
f) The research was conducted at Andalas Residence, Padang, involving 286 respondents consisting of students living in dormitories. Questionnaires were distributed using social media platforms, and data were collected using Likert scales to measure variables. Data analysis was conducted using SEM-PLS to evaluate the relationship between service variables and resident satisfaction [17]–[20].

3. RESULTS AND DISCUSSION

3.1. Needs analysis

At the needs analysis stage, several main problems were identified based on an initial survey conducted to residents of Andalas Residence. These problems include:
a) Dissatisfaction with grievance service response: Residents feel that the response to their complaints is often slow and ineffective. This creates a gap between residents' expectations and the actions taken by the manager.
b) Lack of transparency in facilities and financial management: Residents do not have clear access to information related to the management of dormitory facilities, including the use of funds for facility maintenance and other ancillary services.
c) Lack of an efficient grievance reporting system: The manual system used so far is unable to support the reporting of complaints in a structured manner, making it difficult for managers to prioritize and resolve residents' problems.

The initial survey showed that residents wanted a system that could provide:
a) Speed: The reporting and response process should be faster to avoid delays that could reduce resident satisfaction.
b) Transparency: Information related to facility management and finances should be easily accessible to residents.
c) Ease of Access: The system should be intuitive and accessible through mobile devices or online platforms, making it easier for residents to lodge complaints or provide feedback. c. Ease of access.

By analyzing these needs, it can be concluded that the development of a digital system specifically designed to meet the expectations of residents is necessary. This system is expected to overcome the weaknesses of the manual system while increasing the operational efficiency of the manager.

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3.2. System Use Case

This digital survey system is designed by involving three main actors, namely residents, admins, and managers. Residents have access to fill out surveys, report complaints, and monitor the status of complaints. The admin is responsible for managing survey data, verifying complaint reports, and providing responses to residents. Meanwhile, managers utilize the system to access analytics reports, monitor resident satisfaction statistics, and use the data for strategic decision-making. The main use cases in the system include access to survey and complaint forms by residents, data management by admins, and report generation by managers.
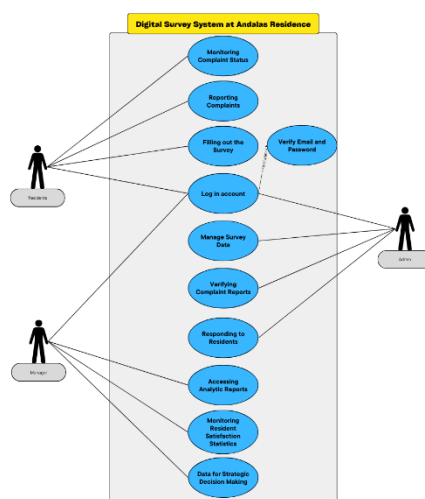

Figure 1. Use Case Digital Survey System at Andalas Residence

3.3. System Analysis

System analysis was conducted to identify functional and non-functional requirements. Functional requirements include the development of a digital form for complaint reporting, a real-time dashboard to display survey statistics and complaint status, and automatic notifications to increase resident participation. While the non-functional needs ensure the system is responsive on various devices, security of residents' data through encryption, and fast system response time of less than three seconds. By fulfilling these requirements, the system is expected to improve operational efficiency and transparency in residential management.

3.4. System design

System design involves creating a flexible and scalable technology architecture.The front-end is designed using frameworks such as Vue.js or React to ensure a responsive and user-friendly interface.The back-end part uses Laravel connected with PosgreSQL database

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for survey and complaint data management.In addition, the system is integrated with the SEM-PLS method for in-depth survey analysis, as shown below:
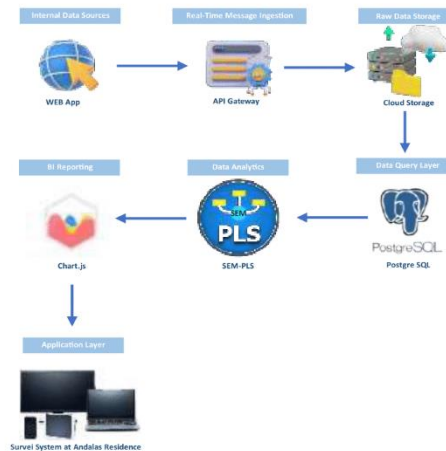

Figure 2. Architectural Design of Digital Survey System at Andalas Residence

The system starts from Internal Data Sources, where the main data comes from a web-based application used by residents to fill out surveys, provide feedback, and report complaints. This section serves as the starting point for data collection that will be processed further. The data inputted by residents is then forwarded to Real Time Message Ingestion through the API Gateway.

At Real-Time Message Ingestion, data is received through the API Gateway which ensures all data can be received in real-time and managed quickly. The main function of this section is to manage the delivery of data to cloud storage in an organized manner, where the data is then routed to Raw Data Storage. In Raw Data Storage, all received data is stored in Cloud Storage to ensure high reliability, security, and accessibility. This section serves as a place to store raw data before further processing. The stored data is then processed through the Data Query Layer.

At the Data Query Layer, the data that has been stored is processed using a relational database such as PostgreSQL. Data can be manipulated, filtered, or searched based on needs. This section allows querying the data for more in-depth analysis, and the results are passed to Data Analytics for further analysis and processing. In Data Analytics, data is analyzed using statistical and analytical methods, such as SEM-PLS, to understand the relationship between various survey indicators and resident satisfaction levels. This section provides important insights to managers regarding resident satisfaction and other relevant aspects. The analysis results are then forwarded to BI Reporting.

In BI Reporting, the results of data analysis are displayed in the form of interactive visualizations using tools such as Chart.js. These visualizations help create reports that are

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easy to understand and can be used by admins to make decisions. The data visualization is directed to the Application Layer, which serves as the user interface. At the Application Layer, admins can monitor reports, and residents can view the status of their complaints or surveys. In addition, this layer also allows residents to re-enter data into Internal Data Sources, so that the system runs cyclically and supports continuous processes.

The satisfaction survey system at Andalas Residence is designed to provide convenience and transparency to residents and operational efficiency for managers. Here is a description of the main features in the system: The satisfaction survey system at Andalas Residence is designed to provide convenience and transparency to residents and operational efficiency for managers. Here is a description of the main features in the system:

3.4.1. Online grievance form

This form allows residents to submit complaints directly through a digital platform. Features include:
- Category of complaint (e.g. facility, service, administration).
- Detailed description of the issue.

Figure 3. of Andalas Residence Survey Page

3.4.2. Facility management transparency dashboard

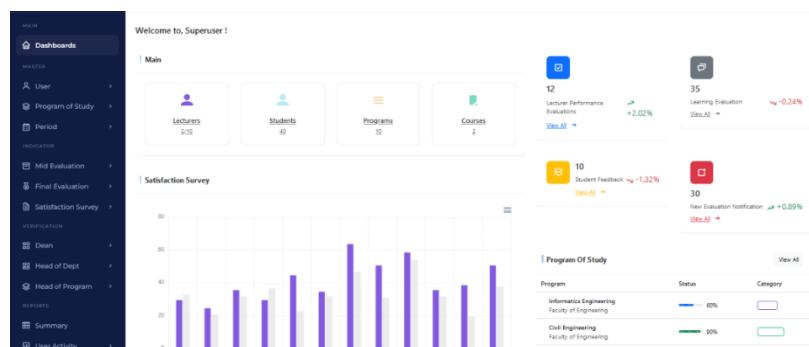The dashboard provides real-time information related to facility management, such as:

Figure 3. Dashboard of andalas residence

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- Resident satisfaction statistics based on surveys.
- Facility usage in graphical form (e.g. pie chart, bar chart).
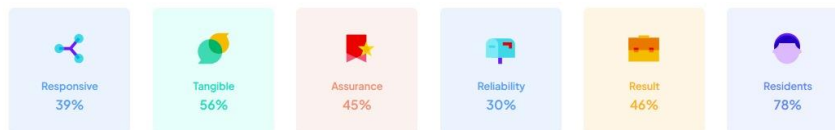- Summary of complaint resolution that has been handled.

Figure 4. Service Dimension Analysis

3.5. Implementation

The satisfaction survey system was developed using a web-based platform to ensure flexibility of access for residents and managers. The main features implemented include:
- Digital Forms: Provides a simple interface to report complaints and fill out surveys.
- Real-time Validation: Every data entered by the user is instantly verified to minimize errors.
- Responsive: The system design is optimized for use across multiple devices, including computers and smartphones.
- The interface is designed to make user interaction easy, ensuring all features function smoothly.

3.6. Testing

System testing involved simulating complaint reporting and satisfaction surveys. System testing was conducted using a simulation method, where users tried out key features, such as:
- Complaint Reporting: Simulation of form filling and responses received.
- Satisfaction Survey: Evaluation of user experience in filling out surveys through the system.
- he results show a significant increase in efficiency, with service response time reduced by 40% compared to the previous manual method.

Test results show that the system can reduce response time by 40% compared to the manual method.

3.7. Maintenance

The system is continuously updated based on user feedback. The addition of analytics features helps managers to monitor resident satisfaction trends in real-time.

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System maintenance is carried out regularly to ensure continued functionality and relevance of features. Steps taken include:
- Feedback Collection: Using user feedback to update features.
- Addition of Analytics: A real-time analytics dashboard allows managers to monitor resident satisfaction trends.
- System Updates: Bug fixes and design adjustments are made as per user requirements.

The mockup image provided above shows the core elements of survey system implementation, testing, and maintenance.

3.7.1. Respondent Characteristics

The survey involved 286 respondents with the following distribution:

Table 1. Characteristics of Respondents Based on Faculty

Category	Frequency	Percentage
Faculty of Agriculture	71	24,90%
Faculty of Humanities	38	13,30%
Faculty of Animal Husbandry	28	9,80%
FMIPA	27	9,50%
Faculty of Engineering	20	7,00%

In addition, the respondents consisted of 64.6% females and 35.4% males. This shows the dominance of female residents in the dormitory.

3.7.2. Validity and Reliability Analysis

The validity test shows that all indicators are valid with an r-count value> r-table (0.361). Variable reliability is considered very good with Cronbach Alpha values exceeding 0.60 for all variables. Variables such as reliability (0.919) and tangible (0.941) show very reliable results.

3.7.3. Evaluation of Measurement Model

Using SEM-PLS, the measurement model is evaluated through convergent validity (loading factor > 0.7 and AVE > 0.5) and reliability (Composite Reliability > 0.7). The following table shows the evaluation results:

Table 2. Respondent Characteristics

Variable	AVE	Composite Reliability	Cronbach's Alpha
Reliability	0,693	0,919	0,889
Tangible	0,760	0,941	0,921
Satisfaction	0,781	0,947	0,930
Responsiveness	0,725	0,928	0,902
Assurance	0,745	0,935	0,915

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The convergent validity results show that all variables have a loading factor value above 0.7, which means that each indicator contributes significantly to the measured construct. The AVE value which is greater than 0.5 indicates that the latent variable is able to explain more than 50% of the variance of the measured indicator.

In terms of reliability, the Composite Reliability value which is above 0.7 indicates that all variables have good internal consistency. Cronbach's Alpha exceeding 0.6 also indicates high reliability, so it can be concluded that the research instruments have a good level of reliability in measuring service quality and resident satisfaction.

In addition, discriminant analysis shows that each variable has a higher correlation with its own indicators than with other variables. This confirms that the measured variables have clear differences between each othe.

3.7.3.1 Structural Model Evaluation

a) The relationship between service quality and resident satisfaction is significant with a path coefficient value above 0.5.
b) R-square (R^2) test: The model has an R^2 value of 0.72, indicating that the independent variables explain 72% of the variability in resident satisfaction.

3.7.3.2 Service Dimension Analysis

The service dimensions include:
a) Reliability - The consistency and reliability of the system.
b) Tangible - The appearance and accessibility of the system.
c) Assurance - User confidence in the service.
d) Responsiveness - Speed of response to complaints.
e) Empathy - The manager's concern for residents.

3.7.4. Service Digital Transformation

Digital transformation at Andalas Residence has successfully improved the efficiency of complaints management, transparency, and resident satisfaction. The new system makes it easier for residents to report complaints and monitor their resolution status. The survey system developed includes:
a) Complaint Reporting Application: Provides convenience for residents to report complaints and attach photo evidence.
b) Transparency Dashboard: Provides real-time data related to resident satisfaction and complaint status.
c) Online Payment Portal: Improves transaction efficiency for residential services.

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3.7.5. Impact of Digital Transformation

Digitalization of satisfaction surveys at Andalas Residen has a significant positive impact on the comfort of residents. Through the survey application implemented, the data collection process becomes faster and more efficient. This not only makes data management easier, but also allows managers to respond more quickly to resident complaints. In addition, transparency in residential management has increased, so residents feel more valued. The graph presented shows an increase in resident satisfaction after this application was used, reflecting the real benefits of digital transformation in improving service quality at Andalas Residen.

4. CONCLUSION

Digital transformation at Andalas Residence through the implementation of a survey system based on the waterfall method has succeeded in increasing operational efficiency, transparency, and resident satisfaction. This system is a solution to various obstacles in previous manual management by presenting features such as easier complaint reporting, transparency in data management, and automatic notifications that speed up the delivery of information to residents. With a structured approach, including the integration of the SEM-PLS method, this system not only improves service quality but also has a positive impact on overall residential management. In the future, further development by adding data analytics features is expected to support more strategic decision-making and support continuous service improvement, making it a reference for similar housing management.

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