

Payment Data Processing in Web-Based Futsal Field Booking System (Futsal Sport Center Case Study)

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ABSTRACT

The demand for futsal field rentals continues to increase along with the popularity of futsal among the public. However, the ordering and payment process is still done manually, causing various problems such as recording errors, long queues, and late payment confirmation. This study aims to design and build a web-based information system that can help the ordering process and manage payment data digitally. This system was developed using the Waterfall method with the PHP programming language and MySQL database, and tested using the black box testing approach. The main features provided include field reservations, schedule management, uploading proof of payment, and validation by the admin. The test results show that the system runs well and provides convenience for both tenants and managers. The implementation of this system provides technopreneurial added value in the form of operational efficiency, improved customer service, and the potential for expanding digital-based services.

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1. INTRODUCTION

The development of futsal sports in Indonesia continues to increase, especially among teenagers and adults. This has a direct impact on the increasing demand for futsal field rental services, both for recreational activities, routine training, and tournaments. However, most futsal field rental service providers still rely on conventional systems, such as manual recording in books or direct bookings on site. This practice is prone to errors in recording schedules, loss of transaction data, and limitations in the payment confirmation process.

This condition encourages the need to utilize information technology to support the operation of futsal field rental businesses. Several studies have developed web-based systems and mobile applications to digitize the ordering process and payment management. This type of system has been proven to increase efficiency, transparency, and data accuracy, as well as provide convenience for users in accessing services anytime and anywhere.

From a technopreneurship perspective, developing a web-based ordering and payment system not only solves technical problems, but also opens up business opportunities based on digital innovation. This innovation creates added value in the form of ease of transactions, optimization of customer service, and integration capabilities with financial technologies such as QRIS, payment gateways, and automatic data-based reports.

Therefore, this study aims to design and implement a web-based futsal field rental information system that supports digital payment data processing. This system is expected to improve business operational efficiency, reduce the risk of recording errors, and strengthen the aspect of professionalism in managing futsal field rental services.

Research related to the digitalization of futsal field rental has been widely conducted, with the main focus on operational efficiency and ease of transactions. Iriadi et al. [1] designing a web-based rental system

at Futsal Station Bekasi using PHP and MySQL, with black box testing that proves the system is able to manage tenant data and schedules well. Similar research was conducted by Merdekawati et al. [2], which also highlights the benefits of digital transaction management in improving recording accuracy. Nurdinillah & Sukendar [3] building a system integrated with a payment gateway for field rentals in Cimahi, with a waterfall approach and web-based interface design that facilitates users in the booking and payment process. Meanwhile, Pradana & Kuswanto [4] using the prototyping method in developing a system for Tangerang City, adding automatic reporting features based on payment type.

Widayati et al. [5] examined the implementation of the rental system at Golden Indoor Soccer Semarang, with the result that the digital system makes it easier for admins to print reports and helps tenants check empty schedules and make direct bookings via the web. Arifin et al. [6] designing a similar system in the SM Futsal Malang Zone, with black box and white box testing methods and system validation results reaching 100%. Laksono & Fachrie [7] from Universitas Teknologi Yogyakarta developed an Android-based system that focuses on payment integration and transaction reporting for futsal and basketball court rentals. This shows a trend that digital transformation in the field rental business is growing, both in the form of web and mobile applications, with an increased focus on user experience and system-based data management. The consistency of the use of the Waterfall method is also found in other studies, such as those conducted by Suherman et al. [8] in designing an information system for Rafhely Futsal. Their research resulted in a web-based system using PHP with the CodeIgniter 4 framework that successfully solved complex scheduling and payment processes that previously had to be done on site. This confirms that the structured development approach is very commonly used for similar cases.

In addition, research by Susanto et al. [9] Vigor Futsal also implemented a web-based system with PHP and MySQL to overcome conventional booking problems such as telephone appointments or manual recording. The resulting system is able to centralize schedule management and make it easier for managers to record rental data. Similarly, research by Ramadhan et al. [10] who designed the online booking system for the mini soccer field at MS Arena Cilegon also proved that the website can provide real-time access to information on field availability, so that customers no longer need to come directly to the location to book.

This trend is further reinforced by a series of other studies that also underline the urgency of shifting from manual to digital systems. Research by Wijaya, Suprpto, & Andika [11] In Nahrul Futsal, for example, explicitly highlighted the risk of data loss and recording errors due to manual processes, and successfully addressed them with a web-based system using the Waterfall method. In line with that, a case study on Giga Futsal Arena by Pratama, Anggoro, & Irawan [12] showed that the manual ordering system that requires new customers to come directly is very inefficient. The web-based application they developed using the SDLC method successfully presented accurate field availability information. Some studies even added unique functionality, such as in Failani's study [13] at Rizquna Futsal which integrates the QR Code feature for faster and safer booking verification. Final project by Irawan [14] at Estadio Futsal Arena also confirmed that a web-based system can be an effective solution for managing customer data, schedules, and rentals that were previously only recorded manually. Finally, research by Astuti & Nuraeni [15] At Futsal Akasia, it was again shown that the application of the Waterfall method in creating web-based applications not only makes it easier for users to see empty schedules, but also greatly helps admins in creating financial reports.

From the various reviews, it can be concluded that the implementation of a web-based ordering system provides significant benefits, including ease of access, acceleration of the transaction process, and efficiency in managing order data and payments. The results of these studies serve as a strong reference in developing the system proposed in this study.

2. METHOD

This research uses a software engineering approach with the Waterfall development model, because this model provides a systematic workflow that suits the project needs. This model consists of five main stages: (1) Needs analysis, (2) System design, (3) Implementation, (4) Testing, and (5) Maintenance.

a. Data Collection Techniques

Data was collected through three methods:

- 1) Observation: Directly observe the manual rental process at partner locations to identify problems.
- 2) Interview: Conducted on field managers to obtain information about workflow and system requirements.
- 3) Literature review: Review scientific references from journals and previous research that are relevant to the topic.

b. System Design and Implementation

The system is designed using UML diagrams, such as use case diagrams to describe user flows and class diagrams for data structures. Implementation is done using the PHP programming language and MySQL database, and utilizes a responsive design framework so that the system can be used on various devices.

c. System Testing

Testing is done with a black box testing approach, which focuses on testing the system's functionality from the user's side. All major features such as login, ordering, uploading proof of payment, and generating reports are tested to ensure the system runs according to needs.

3. RESULTS AND DISCUSSION

The system developed in this study has main features that have been designed to facilitate the management of payment data and the booking process for the futsal field rental service. These features include registration and user login, checking real-time field availability, and booking fields by determining the date and rental duration. The system provides digital payment methods. These methods include e-wallets, bank transfers, and credit cards. Users can upload proof of payment after payment is made, which will then be verified by the admin. The admin's authority is to change the booking status and validate transactions. This system is to support administrative management and is equipped with a transaction report feature. The admin can access and download this report at certain periods.

System testing was conducted using the black box testing method to ensure that all system functions run according to specifications. Based on the test results, all main features showed good performance, including the ordering process, uploading proof of payment, validation by the admin, and report generation. The system is able to respond to valid and invalid input with appropriate output, and provide notifications to users appropriately.

a. Main Systems and Features

The system has two user interfaces: one for tenants and one for admins. The tenant interface includes functions for account registration, login, viewing field availability schedules, making reservations, selecting payment methods, and uploading proof of transfer. Meanwhile, the admin interface functions to manage field data, verify payments, monitor rental schedules, and generate transaction reports automatically.

To describe the activities of users and admins in running the system, an activity diagram is used. This diagram provides an overview of the end-to-end process from logging in, ordering, uploading proof of payment, to verification by the admin and status updates.

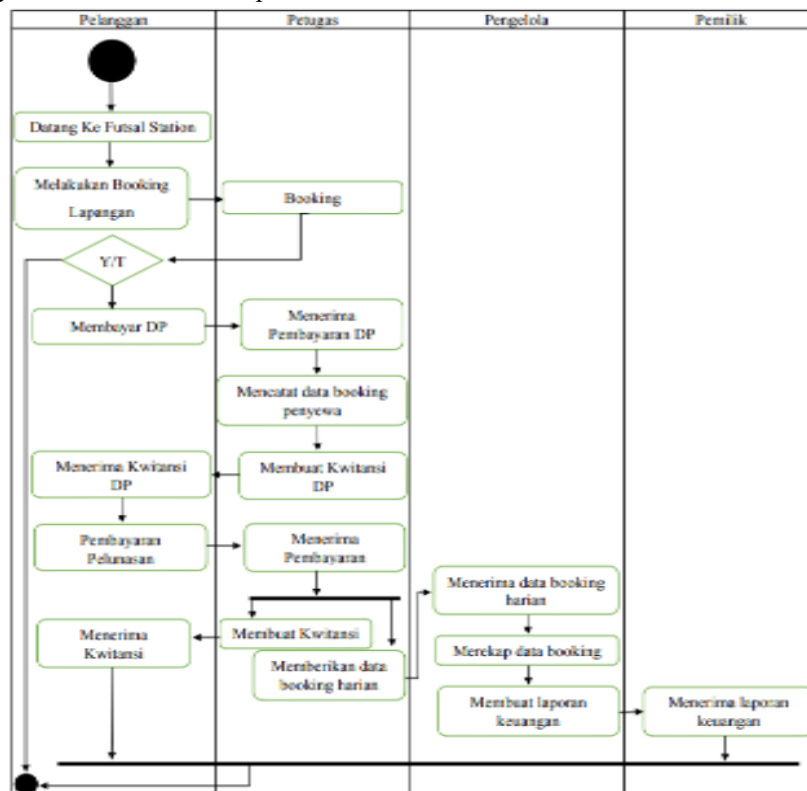


Figure 1. Sport Center Activity Diagram

After the activity process is described, the system is explained from a functional perspective through a use case diagram. This diagram shows the relationship between actors and system functions.



Figure 2. Use Case Sport Center

The internal structure of the system is represented by a class diagram, which shows how the data in the system is interconnected.

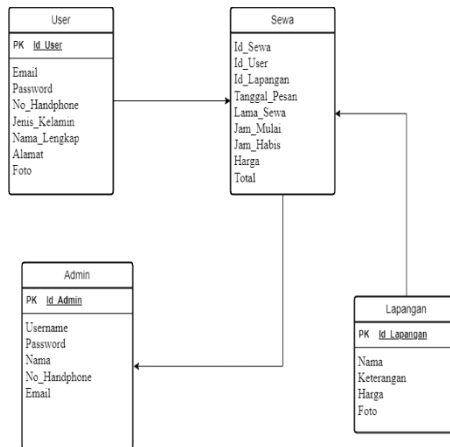


Figure 3. Sport Center Class Diagram

After successful login, the user will be directed to the main page that displays various menus such as schedule check, booking form, and transaction status information. At this stage, the user can choose the time and field available in real-time.

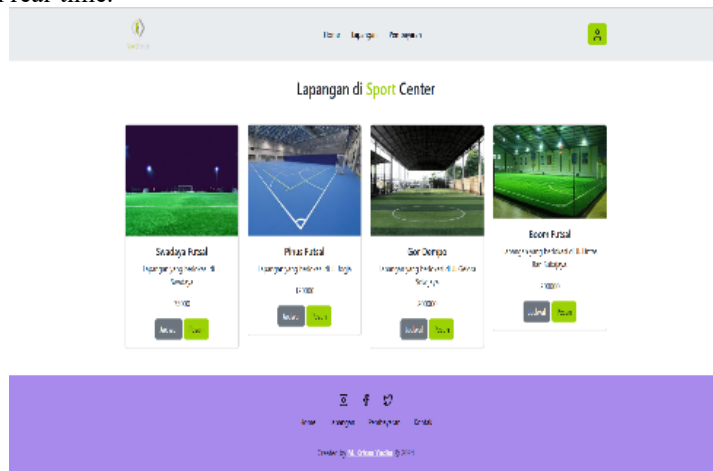


Figure 4. Field Order Form View

After filling out the form, the system will generate a unique transaction code. The user is then directed to the payment page to upload proof of transfer.

Figure 5. Payment Page View

Admin has access to the verification dashboard, where all uploaded proof of payment will be displayed in the form of a transaction list. Admin can open, verify, and change the status of transactions according to their validity.

Figure 6. Admin Dashboard View - Payment Verification

b. Test Results

System testing is done using the black box testing method to ensure that all features run according to the designed specifications. All tests show valid results and the system works as expected, both on valid and invalid input.

Some of the key test results include:

- 1) Login and registration: The system successfully validated the input, prevented account duplication, and provided error notifications.
- 2) Field reservations: The system displays real-time schedules and automatically rejects bookings that conflict with other schedules.
- 3) Upload proof of payment: The system saves files and data related to proof of payment into the database without error.
- 4) Admin verification: Admin can verify the evidence and change the transaction status, which is automatically displayed to the user's account.
- 5) Transaction report: Transaction data is recorded and displayed according to the selected time filter, and can be downloaded in document format.

c. Discussion

The implementation of this system has a positive impact on the digitalization process of futsal field rental services. The system significantly shortens the booking and payment confirmation time compared to manual methods. Processes that previously required direct contact or indirect communication via messages can now be done through the system with full transparency.

From the technopreneurship side, this system is not only an operational tool, but also part of technology-based service innovation. Ease of access for tenants, automation of reporting for admins, and integration with digital payment systems create added value that can be developed further.

Future system development can be directed at the integration of QRIS and payment gateways, the implementation of automatic notifications (email/WhatsApp), and transformation into an Android/iOS-based mobile application to make it more flexible for customers to use.

4. CONCLUSION

Based on the results of this study, it can be concluded that the web-based futsal field booking system that was developed has succeeded in optimizing the processing of payment data effectively and efficiently. The system facilitates the process of recording transactions and verifying payments automatically, so that the booking confirmation process becomes faster and data input errors can be avoided.

minimized. Payment data is stored in a structured manner in a database, facilitating the creation of financial reports and internal audit activities. The main implication of developing this system is increasing the accuracy and security of payment data, while providing convenience for both customers and futsal field managers.

Although the system has been functioning well, there are some aspects that can still be improved. Integration with popular digital payment methods (such as e-wallets and bank transfers) needs to be developed to increase transaction flexibility for users. Implementation of additional security protocols, such as stronger encryption on payment data, also needs to be considered to maintain the confidentiality and integrity of information. Optimizing the user interface to be more responsive and easier to use is expected to improve the customer experience. In addition, the development of analytical reporting features or integration with mobile platforms can expand the benefits of this system and reach more users.

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