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Article

The Implementation of a Web-Based Outdoor Equipment Rental System Design (Case Study: L3 Adventure)

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Abstract: *The advancement of information technology has transformed work methods and data management, especially among Gen Z. UMKM L3 Adventure, which rents out camping equipment, still uses manual processes for booking and data management. The COVID-19 pandemic highlighted the need for adopting an online booking system to reduce physical contact and enhance operational efficiency. This research aims to develop a web-based information system for L3 Adventure, focusing on designing an efficient and accessible online camping equipment booking system. A qualitative and quantitative approach was used, with structured surveys conducted at L3 Adventure in Sukodono, Sidoarjo. Data was collected through observation, interviews, and relevant literature. The research findings indicate that the web-based system improves data management and booking efficiency. The system employs a waterfall design model and was tested using the blackbox method to ensure its functionality. This study contributes to the development of outdoor equipment rental information systems, aiming to enhance efficiency and user experience at L3 Adventure.*

Keywords: *Information System; Information Technology; Online Booking System; Outdoor Equipment Rental, Website*

1. Introduction

The rapid advancement of information technology has brought significant changes in various aspects of life, especially for the Gen Z generation. The use of computers and the internet has surged, replacing traditional work methods with more efficient and faster technology [1] [2]. Information technology, especially computers, has now become important in the storage and processing of information as well as quick access to data via the internet [3]. L3 Adventure, a small and medium-sized enterprise (SME) engaged in the camping equipment rental business, currently still relies on manual processes for ordering and managing customer data. This has caused various obstacles, such as low efficiency and a high risk of human error in data management. With the COVID-19 pandemic, the need for an online ordering system has become increasingly urgent to reduce physical contact and improve operational efficiency [4]. Therefore, the development of a web-based system is proposed to facilitate the ordering of camping equipment, improve management efficiency, and provide real-time information on item availability.

Previous research related to outdoor equipment rental systems shows various relevant approaches. [5] Developing an Android application with equipment listing and transfer proof features, while [6] using the Waterfall method for camping equipment rental applications, and [7] using Location-Based Service techniques for a web-based camping equipment rental recommendation system. [8] Designing a web-based system with an average SUS score of 7.8, and [9] developing an Android application with rental

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contract features and equipment information. However, there are several research gaps: first, there has been no research discussing the implementation of a web-based system integrated with an efficient database specifically for local SMEs like L3 Adventure. Second, previous research has focused more on application features and user interfaces, without exploring the optimization of data management and real-time information. Third, although many use evaluation techniques such as the SUS score, there has been no adjustment for the specific needs of SMEs with limited resources. This research aims to fill that research gap by developing a web-based outdoor equipment rental information system that focuses on data management efficiency and real-time information provision.

In the development of a web-based outdoor equipment rental information system, several supporting theories are used. An information system is an internal structure of an organization that manages operations and provides information for various purposes, consisting of hardware, software, and people who collect, process, store, and deliver information [10]. A system can be defined as a series of interconnected procedures to achieve specific goals, with characteristics such as boundaries, environment, input, output, components, links, and storage [11] [12]. Information is defined as data that has been processed into a form that is more useful and meaningful to the recipient [13]. System design is the process of grouping and organizing components to achieve specific goals, which involves the selection of interrelated and systematic parts and parameters [14]. System requirements analysis includes understanding functional and non-functional requirements, such as operational, performance, and security [15] [16] [3] [17]. Flowcharts and Entity Relationship Diagrams (ERD) are used to illustrate the workflow and data relationships within the system [18] [19] [20]. Thus, this research will integrate various methods and theories to develop an efficient and effective web-based outdoor equipment rental information system at L3 Adventure.

Based on the background that has been explained, this research will discuss several issues, namely: how to implement the design of an outdoor equipment rental system based on a website at L3 Adventure? How to implement a database for the outdoor equipment rental system at L3 Adventure based on a website? How to design an information system so that renters receive updated information on item availability?

2. Materials and Methods

This research uses qualitative and quantitative methods with a structured survey conducted at L3 Adventure, Sukodono, Sidoarjo, East Java. [21] [22]. A systematic and empirical approach is applied to the analysis of problems and data. Data were obtained through direct observation, interviews, and literature review. Data grouping techniques include location observation to identify rental equipment prices and types, interviews with owners to gather data on equipment prices, and reading books, journals, and related documents.

Data analysis is conducted using quantitative techniques for statistical data and qualitative techniques for descriptive data. In the application design, this research uses the waterfall design model, which includes requirements analysis, design, implementation, integration, and maintenance. The analysis of the current system is depicted through a Flowmap, while the analysis of the proposed system is explained through a flowchart. The analysis of needs includes data requirements and functional requirements. Data requirements include information on items and rental costs, while functional requirements encompass the provision of location information, item lists, and prices flexibly through the internet and an Android-based system. The system testing technique is carried out using the blackbox method to test specific system functions.

Overall, this research aims to develop a web-based information system for L3 Adventure to improve the efficiency of booking and data management through a systematic approach involving observation, interviews, and literature study, as well as the application of the waterfall design model.

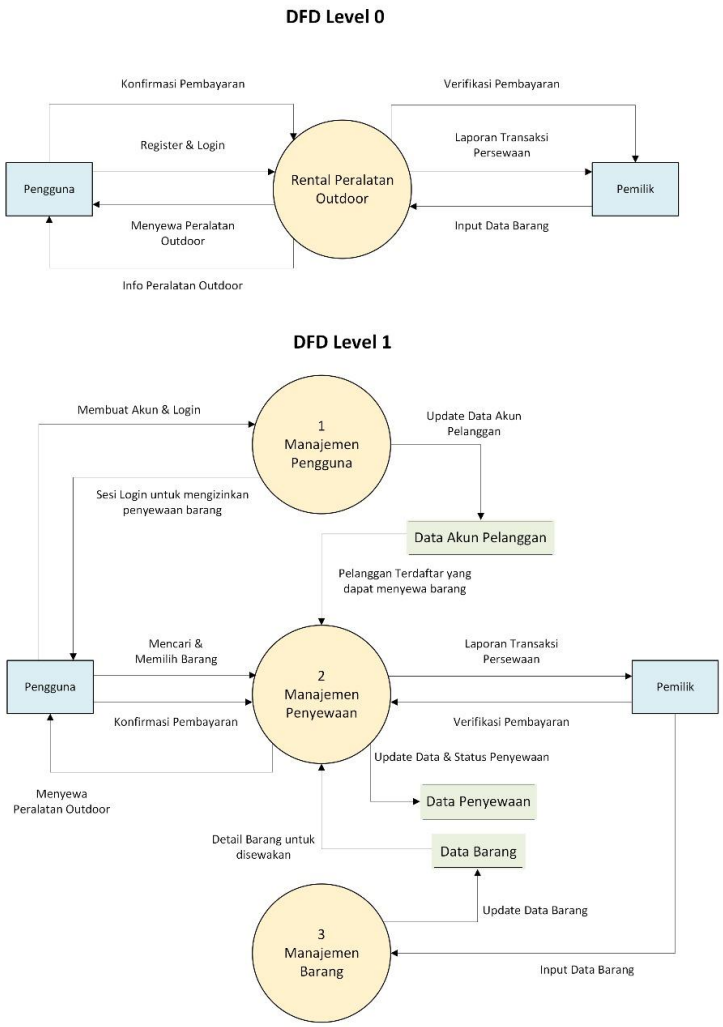


Image 1. Data flow diagram (Dfd)

Figure 1 is a representation of the Data Flow Diagram (DFD) consisting of two levels, namely Level 0 and Level 1, which are used to illustrate the flow of data and processes in the outdoor equipment rental system.

DFD Level 0 provides an overview of the outdoor equipment rental system. At this level, there are three main entities involved, namely Users, the Outdoor Equipment Rental System, and the Owner.

In DFD Level 1, the process depicted in Level 0 is broken down into several more detailed subprocesses, namely User Management, Rental Management, and Item Management. In this subprocess, users can search for and select the items they want to rent. After selecting the item, the user confirms the payment. The system then updates the rental data and generates a transaction report that is sent to the owner.

The data flow in this system is depicted through arrows that show the transfer of information between processes. Some important data flows include: inputting product data & payment verification.

Transaction Report: The system generates rental transaction reports provided to the owner for monitoring and management purposes.

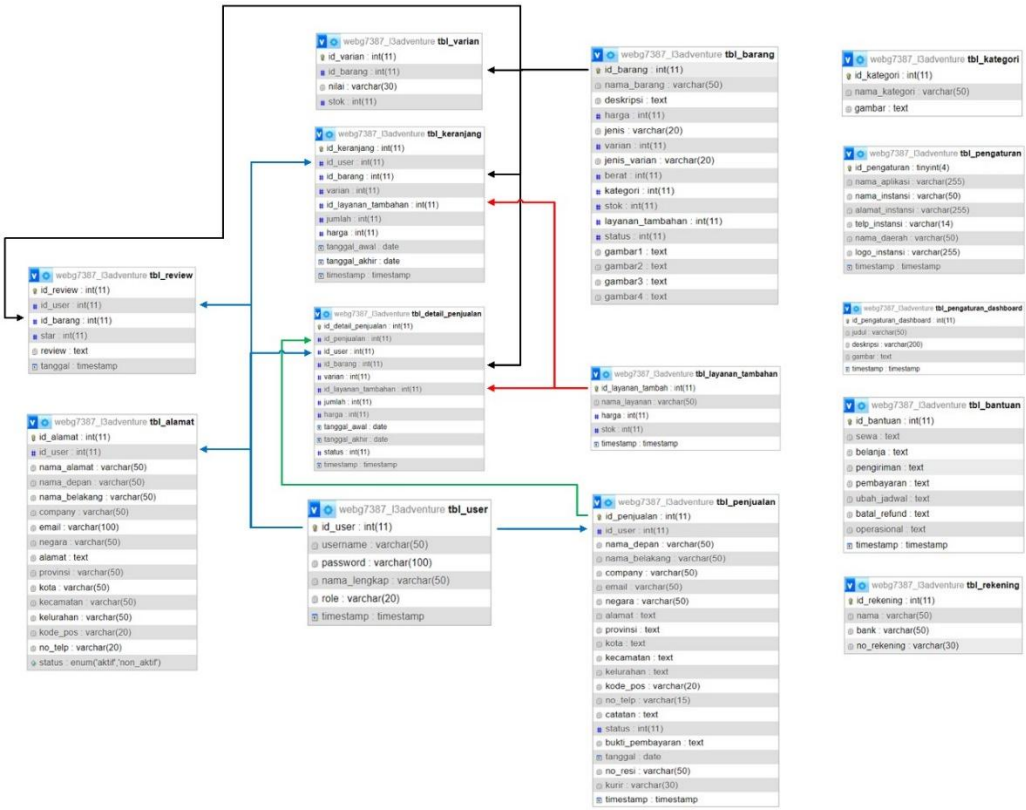


Image 2. Table Relationship

Figure 2. The table relationship explains the system requirements analysis using an Entity Relationship Diagram (ERD) that illustrates the relationships between entities in the database of the system being developed. This ERD helps in designing an efficient and effective database structure for the system.

The relationship between tables is shown through connecting lines in the ERD diagram. Each connecting line between two tables indicates the presence of a Foreign Key that links one table to another. For example, the tbl_keranjang table is connected to the tbl_user and tbl_barang tables through the id_user and id_barang attributes, which indicates that each item in the cart is linked to a specific user and item.

The implementation of this database structure is important to ensure the integrity and efficiency of the developed system. Each relation must be maintained consistently to prevent anomalies in data storage. The use of primary keys and foreign keys in this design also ensures clear relationships between data within the system.

3.

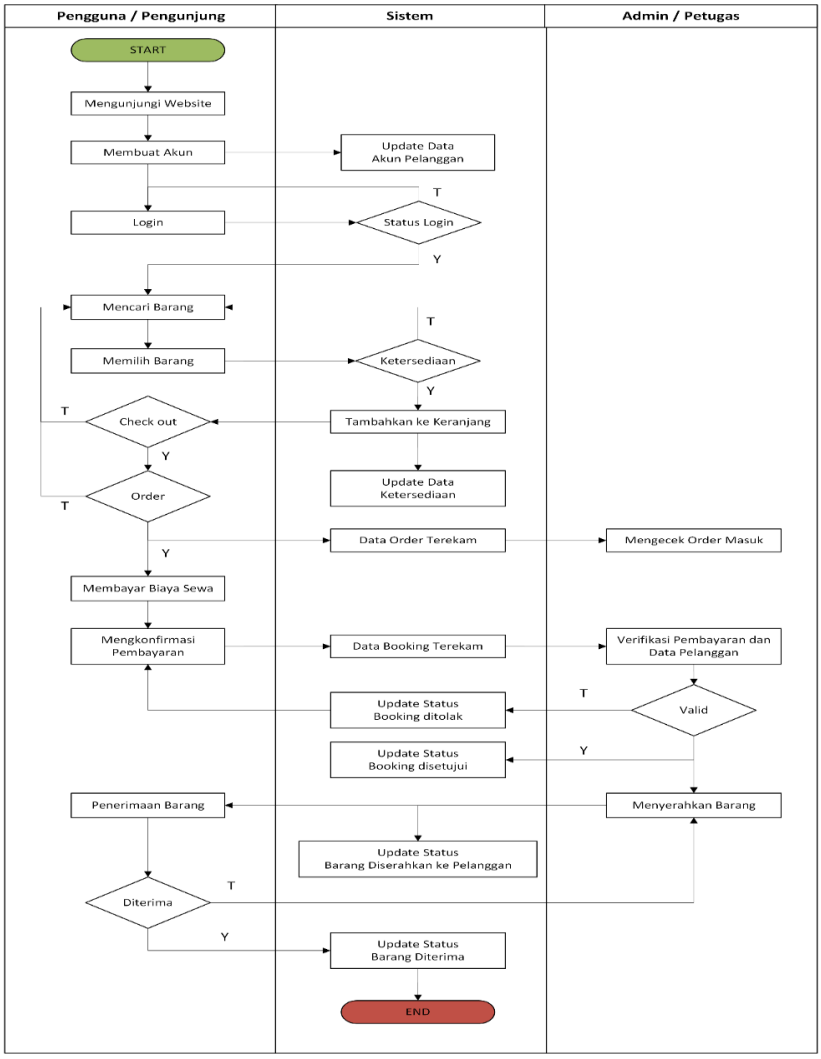


Image 3. Recommended Flow Chart

Figure 3. The recommended flow chart starts with users accessing the site, then registering or logging into their accounts. After that, they select the tool from the catalog, enter the rental details, and the system checks availability. If the tool is available, the user adds it to the cart and proceeds to the checkout and payment process. After payment is confirmed, the tool is delivered or can be picked up by the user. After the rental period ends, the equipment is returned or picked up, and users can provide ratings and reviews about their experience. The process ends after the equipment is returned.

4. Results

A. Result

This research presents the design and functionality of the L3 Adventure website that has been developed and can be accessed at https://l3adventure.my.id/ . This website is designed to serve two main types of users, namely Users/Customers and Owners/Admins, with the main page and features tailored to each role.

For Users/Customers:

1. **Image 4. The HOME page consists** of three main sections: Dashboard with a promotional slider, categories to display rental products, and a tent rental menu showcasing interesting random products. This page also provides navigation to access the rental page, help, as well as the search and login features.

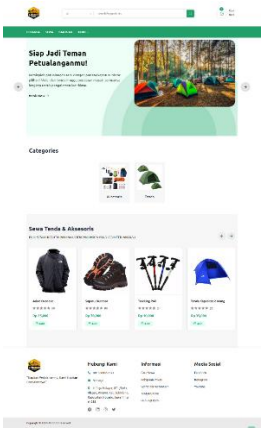
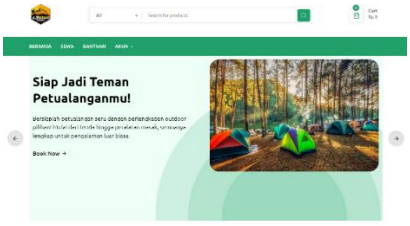
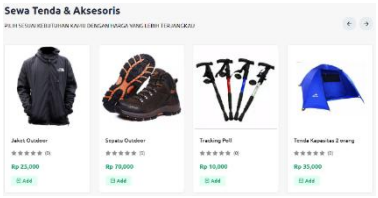


Image 4. Homepage



Gambar 5. Dashboard



Gambar 6. List of Products for Rent by Category

Figure 5. Explaining the Dashboard designed to attract visitors' attention with business promotions. Categories display rental items grouped into two main categories: Accessories and tents. Clicking on a category will direct you to the product listing page, where visitors can select available items for rent.

Figure 6. Displays several lists of products for rent from both categories, namely Tents & Accessories

2. The **rental page** functions to rent products. Users can view product details, fill out the rental form, add items to the shopping cart, and proceed to the payment process after logging in. The checkout process involves filling out data and confirming payment through the available form.

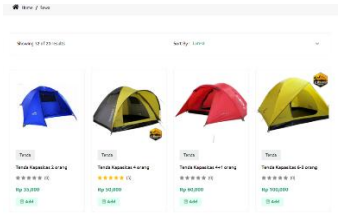


Image 7. Rental page

Figure 7. Rental page Visitors can view product details by clicking on the product image, which will display information such as images, name, rating, rental price, category, availability, variants, rental date, quantity, description, operational details, and reviews. This display is designed to resemble a typical e-commerce site so that users are more familiar with it.

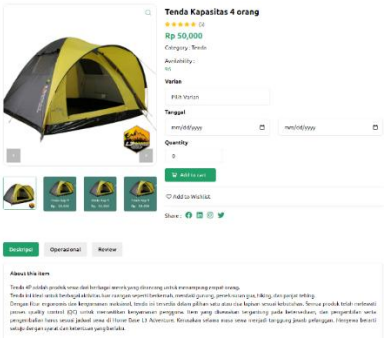


Image 8. Product/Item Rental Details

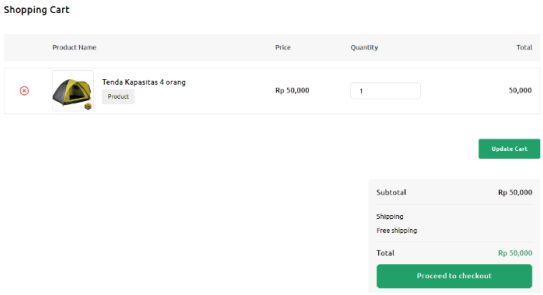
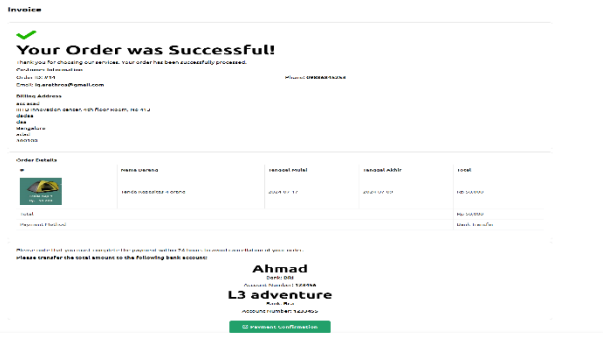
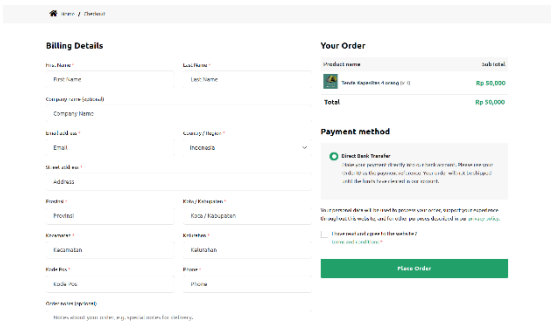


Image 9. Shopping cart

Figure 8. Visitors can add products to the rental list by clicking the "Add to Cart" button. Visitors must log in first to use this feature. Figure 9. The products that have been added will appear in the shopping cart. If you want to rent another product, visitors must repeat the same process.

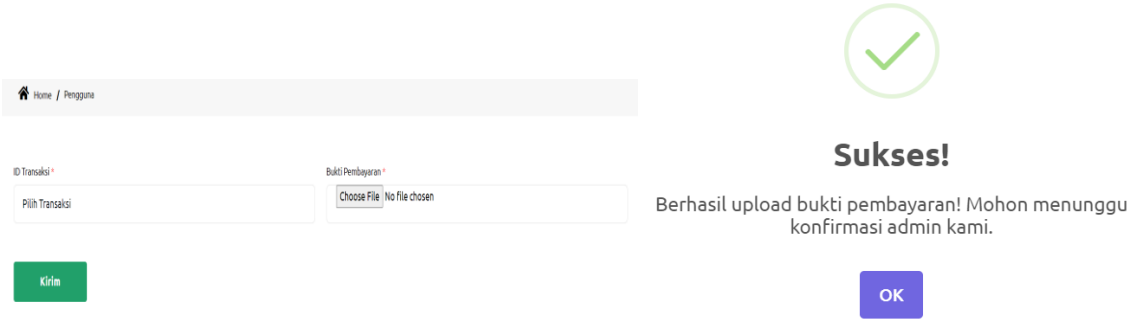




Gambar 10. Billing details

Gambar 11. Invoice dan detail informasi penyewaan barang

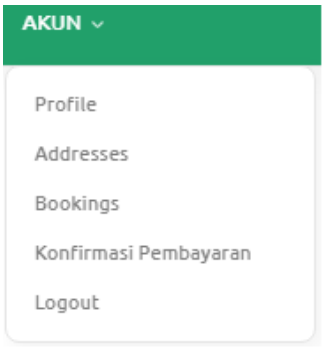
Gambar 10 Untuk melanjutkan ke pembayaran, pengunjung bisa mengklik tombol "*Proceed to Checkout*", yang akan menampilkan halaman "*Billing Details*" berisi data pengunjung dan daftar pesanan. **Gambar 11**. Setelah mengisi informasi yang diperlukan, pengunjung bisa mengklik "*Place Order*" untuk menerima *invoice* dan detail penyewaan.



Gambar 12. Form konfirmasi pembayaran dan pesan pop up unggahan bukti pembayaran berhasil

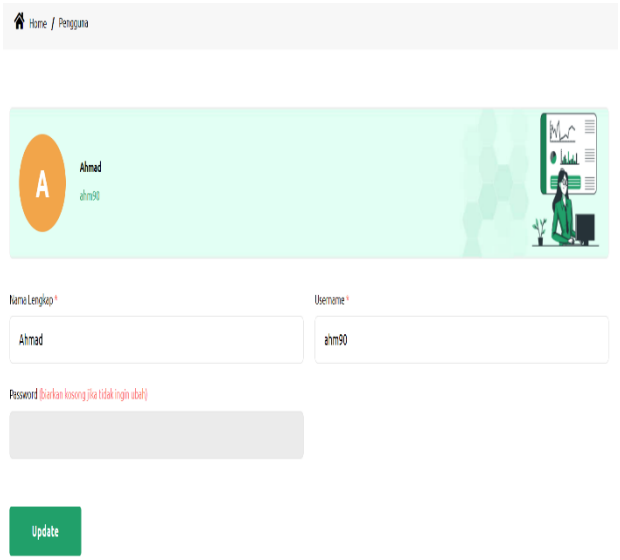
Pada **Gambar 12**. Jika pengunjung telah melakukan transfer biaya sewa, mereka dapat mengonfirmasi pembayaran dengan mengklik "*Payment Confirmation*" dan mengisi ID transaksi serta bukti pembayaran. Setelah konfirmasi, sebuah pop-up akan muncul menunjukkan bahwa unggahan bukti pembayaran berhasil.

3. **Halaman LOGIN/ AKUN** memberikan akses untuk mengelola informasi pribadi, alamat, pesanan, dan booking, serta mengunggah bukti pembayaran.

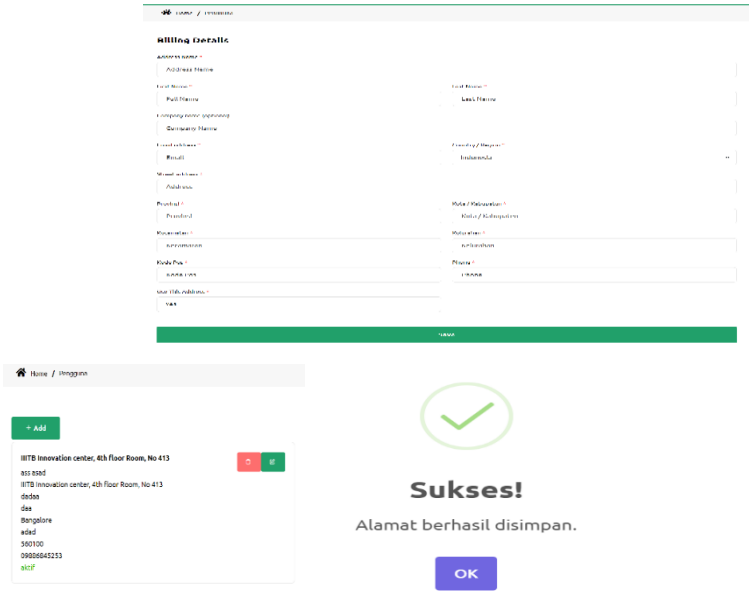


Gambar 13. Sub menu pada akun

Gambar 13. Pada halaman login atau akun di *website* L3Adventure berfungsi untuk mengakses profil pengguna, menampilkan menu login sebelum login dan akun setelah login. Website ini dirancang untuk memudahkan pengguna dalam mengelola berbagai aspek transaksi dan proses booking serta konfirmasi pembayaran.

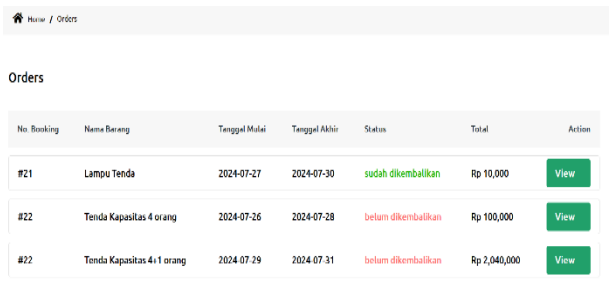


Gambar 14. Halaman profile

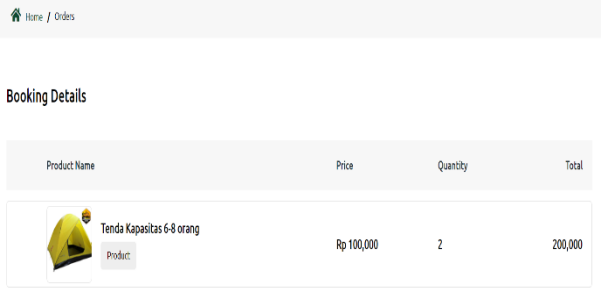


Gambar 15. Halaman addresses

Gambar 14. Menu *drop-down* akun menyediakan akses ke berbagai fitur, termasuk *profile* untuk memperbarui informasi dasar pengguna, **Gambar 15**. *addresses* untuk mengelola alamat pemesanan

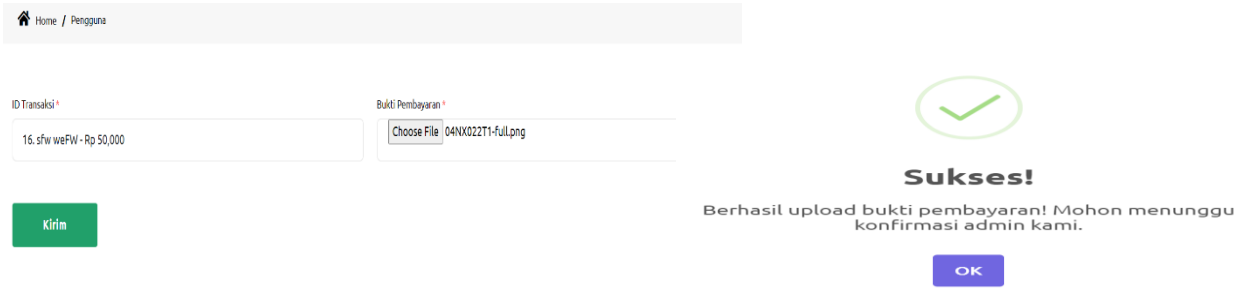


Gambar 16. Halaman orders



Gambar17. Halaman bookings

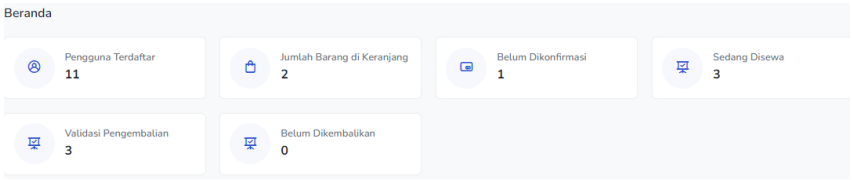
Gambar 16. Orders untuk melihat pesanan yang telah dilakukan, pada **Gambar17**. bookings untuk meninjau barang yang sudah dibooking dan dibayar beserta statusnya, konfirmasi pembayaran untuk mengunggah bukti pembayaran, dan *logout* untuk keluar dari akun dan kembali ke halaman utama.



Gambar 18. Form unggah bukti pembayaran dan pop up pesan unggahan bukti pembayaran berhasil

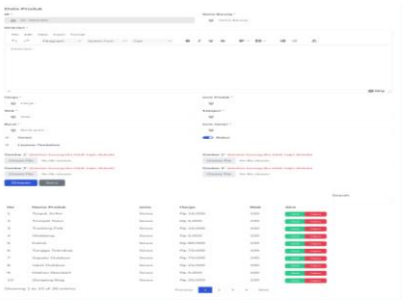
Untuk Pemilik/Admin:

1. **Gambar 19**. **Halaman HOME** menampilkan dashboard yang memberikan beberapa informasi yang penting mengenai data *website*.



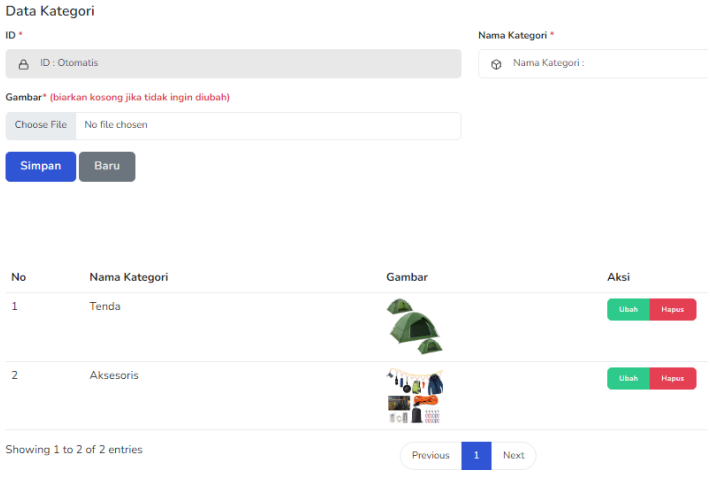
Gambar 19. Tampilan *home* untuk Admin/Pemilik

2. **Gambar 20. Halaman PRODUK** mengelola produk sewa dan layanan tambahan melalui dua sub-menu: Data produk dan layanan tambahan.



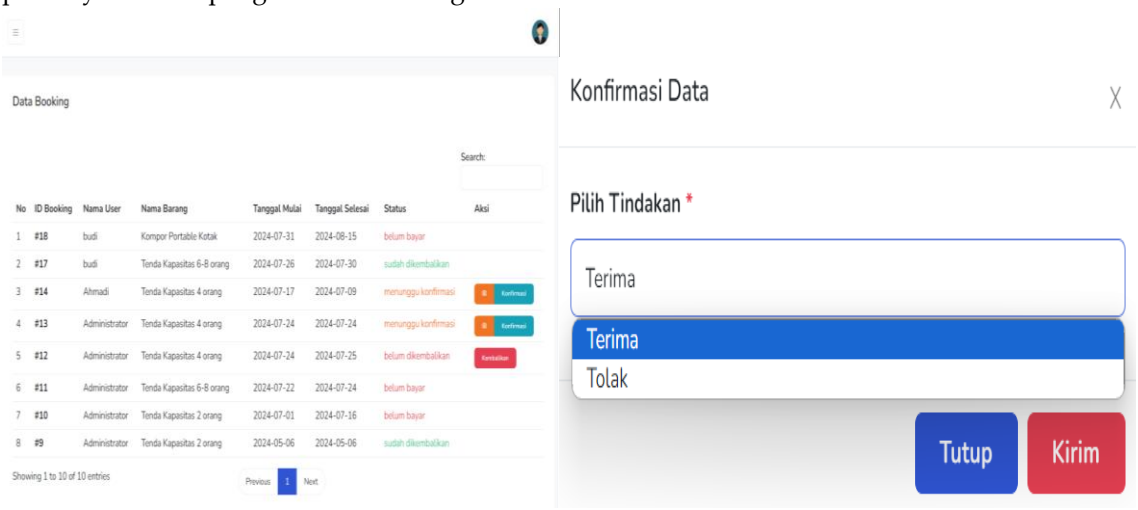
Gambar 20. Halaman produk

3. **Gambar 21**. **Halaman KATEGORI** memungkinkan pemilik untuk mengelompokkan produk ke dalam kategori-kategori tertentu guna mempermudah pencarian.



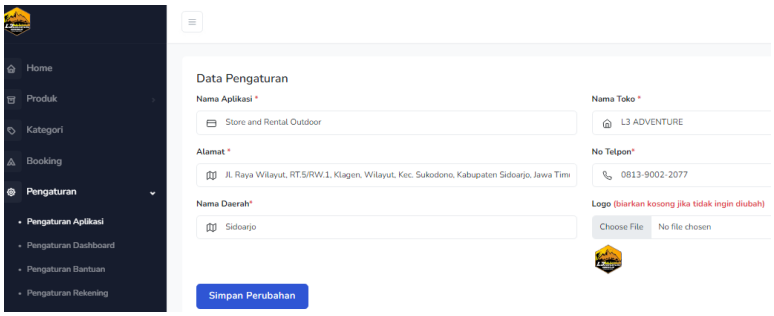
Gambar 21. Halaman kategori

4. **Gambar 22**. **Halaman BOOKING** menunjukkan status barang yang telah dipesan, termasuk konfirmasi pembayaran dan pengembalian barang.



Gambar 22. Halaman booking dan tampilan aksi konfirmasi data

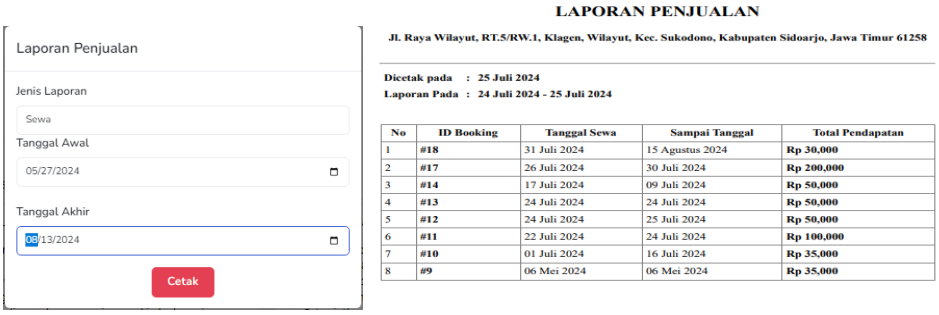
5. **Gambar 23**. **Halaman PENGATURAN** memiliki empat sub-menu untuk mengelola aplikasi, dashboard, bantuan, dan informasi rekening.



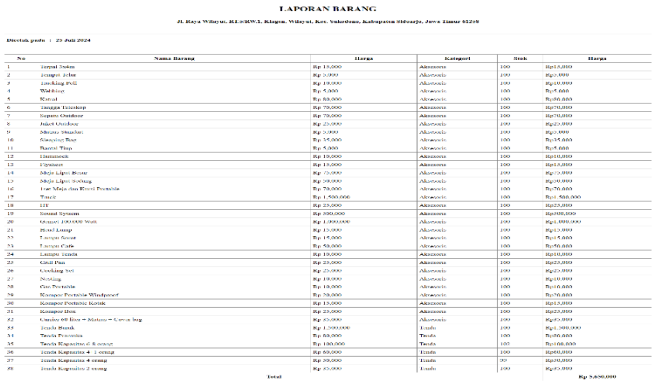
Gambar 23. Halaman pengaturan aplikasi

Gambar 23. Pada menu Pengaturan ini memungkinkan perubahan informasi yaitu : untuk pengaturan aplikasi bisa merubah informasi dasar *website*. Pengaturan dashboard mengelola header promosi yang dapat digeser kanan-kiri. Pengaturan bantuan menyediakan panduan langkah-langkah untuk tujuh informasi: Sewa, berbelanja, pengiriman, pembayaran, ubah jadwal, batal refund, dan operasional. Pengaturan rekening mencantumkan dan mengubah nomor rekening untuk pembayaran, termasuk nama pemilik rekening, nama bank, dan nomor rekening.

6. **Halaman LAPORAN** menyediakan laporan dalam format PDF, mencakup laporan penjualan dan laporan barang.



Gambar 24. Pop up pilihan jenis laporan penjualan dan hasi cetaknya



Gambar 25. Hasil cetak laporan barang

Gambar 24. Mengklik laporan penjualan akan memunculkan pop-up untuk memilih rentang waktu data penyewaan, kemudian menampilkan laporan dalam format PDF setelah klik cetak. **Gambar 25.** Mengklik laporan barang akan menampilkan rekapitulasi semua barang di *website*, termasuk stok, harga, dan total harga masing-masing barang dalam format PDF.

Secara keseluruhan, *website* L3 Adventure dirancang untuk mempermudah pengguna dalam proses penyewaan atau pembelian alat outdoor dan memberikan alat manajemen yang efektif bagi pemilik untuk mengelola produk, transaksi, dan laporan.

B. Pembahasan

Tabel 1. Hasil pengujian blackbox pada *website*

Jenis Akses	Pengujian	Tujuan	Hasil	Catatan
PENGGUNA	NON AKUN			
	Membuat akun	Membuat akun untuk menyewa	Berhasil	
	Login akun	Login untuk menggunakan website	Berhasil	
	Pencarian barang menggunakan keyword	Memudahkan pencarian barang	Berhasil	
	Dashboard	Mengecek link dan tampilan dashboard	Berhasil	Link "*Book Now*" mengarahkan ke halaman yang sesuai
	Categories pada homepage	Melihat respon kategori	Berhasil	

Jenis Akses	Pengujian	Tujuan	Hasil	Catatan
	Sewa tenda & Aksesoris pada homepage	Menampilkan produk sewa acak	Berhasil	
	Halaman sewa	Tampilan dan fungsi halaman sewa	Berhasil	
	Halaman bantuan	Tampilan dan fungsi halaman bantuan	Berhasil	
	Membuka detail produk	Tampilan detail produk	Berhasil	
	Menambahkan barang ke cart	Memasukkan barang ke keranjang	Berhasil	Variasi isian form gagal; quantity harus lebih dari nol
	Update cart	Refresh data keranjang	Berhasil	
	Proceed to checkout	Halaman konfirmasi alamat dan pesanan	Berhasil	Pengguna harus checklist "*I have read and agree to the website*"
	Place order / invoice	Halaman invoice	Berhasil	Tombol payment confirmation mengarahkan ke halaman yang sesuai
	Konfirmasi Pembayaran	Pengunggahan bukti pembayaran	Berhasil	Semua file bisa diupload, tidak ada syarat khusus ekstensi
	Logout	Logout dari akun yang sudah login	Berhasil	
	Profile			
AKUN	Halaman profile	Menampilkan informasi profile	Berhasil	
	Update profile	Mengubah data profile	Berhasil	
	Halaman address	Mengelola alamat	Berhasil	
	Update alamat	Mengubah data alamat dan memilih yang aktif	Berhasil	
	Halaman booking	Menampilkan barang yang sudah dibooking	Berhasil	
	Update booking	Perubahan data pada booking	Berhasil	Semua pesanan valid muncul dengan status yang diupdate
	Login Admin			
PEMILIK	Login Admin	Masuk ke akun admin	Berhasil	
	Home	Menampilkan dashboard	Normal	
	Produk	Manajemen produk	Normal	
	Kategori	Pengelompokan produk	Normal	
	Booking	Daftar barang yang sudah dipesan	Normal	
	Pengaturan	Pengaturan website	Normal	
	Laporan	Menampilkan laporan PDF	Normal	

Testing of the web-based outdoor equipment rental system shows success in login, account creation, and user data management. However, there are significant

shortcomings in the search feature, page layout, and transaction management, which may be caused by implementation errors, bugs, or suboptimal interface design. According to [10], information systems must manage and convey information efficiently, and these deficiencies indicate that the system has not yet fully met that objective. [11] underscores the importance of procedure integration in the system, which has not yet been fully realized in the search feature and page display.

C. Preparation of Research Instruments and Selection of Respondents

The instrument used for testing is a questionnaire designed to measure the usability of the L3 Adventure website. This questionnaire, as shown in Figure 26, consists of 10 questions adapted from the standard SUS (System Usability Scale) questionnaire, with each question using a five-point Likert scale.

The questionnaire in Google Form format was distributed to users of the site relevant to outdoor equipment rental services. In Table 1. Respondents were selected from a list of 9 active users who have visited or shown interest in outdoor equipment rental services. This selection is made to ensure that the data obtained aligns with the target market and is relevant to the research.

Image 26. SUS Questionnaire

No	Reponden	Skor Hasil Hitung										Jumlah	Nilai (Jumlah x 2.5)
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	Responden 1	3	4	3	2	4	4	4	4	2	2	32	80
2	Responden 2	4	4	4	4	3	4	3	4	3	3	36	90
3	Responden 3	3	4	3	2	4	4	2	4	4	2	32	80
4	Responden 4	3	4	3	2	4	4	3	4	3	2	32	80
5	Responden 5	3	1	3	3	2	3	3	3	3	1	25	62.5
6	Responden 6	2	4	2	4	2	3	2	4	2	4	29	72.5
7	Responden 7	4	2	4	3	3	3	4	4	4	0	31	77.5
8	Responden 8	2	4	2	4	2	4	2	4	2	4	30	75
9	Responden 9	4	4	4	1	4	4	4	4	4	4	37	92.5
		Skor Rata-rata (Hasil Akhir)											78.89

Table 1. Result of the SUS score calculation

D. Data Collection

Out of the total number of questionnaires distributed, only 9 respondents provided feedback. Although this number is small, the data can still be used to measure usability. According to [26], there is no specific number of respondents to obtain usability evaluation results. However, the 16 ± 4 rule, which means the number of users between 12 and 20, usually provides test results with a high level of validity.

E. Analysis of Result

Analysis of the SUS score for the website l3adventure.my.id, based on respondents' feedback, shows a score that can be displayed in **Figure 27**.

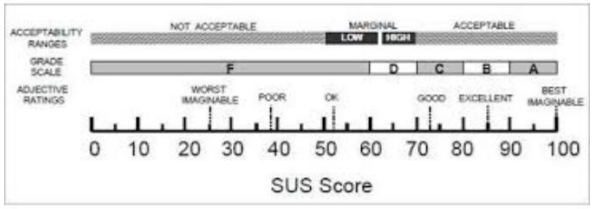


Image 27. Interpretasi skor SUS menurut Bangor dkk

In **Figure 27**. The calculation results of the SUS score for the website l3adventure.my.id, based on respondents' feedback, show a value of 78.89. Figure 3 displays the interpretation of the SUS score according to [27], with an Acceptable result and a grade of B. The blue dashed vertical line in Figure 3 indicates the position of the SUS score obtained in the evaluation of the website l3adventure.my.id.

5. Discussion

The testing and evaluation of the L3 Adventure website demonstrate that the system functions effectively for both user and admin access. Based on black-box testing, all primary features—from user registration, login, item browsing, cart management, to checkout and payment confirmation—performed successfully. Users were able to interact with the homepage, explore categorized products, access rental forms, and complete transactions without encountering critical errors. Notably, the site also enables users to manage their personal profiles, addresses, and bookings efficiently through the account dashboard.

Despite the overall success, there are some areas requiring improvement. During testing, minor issues were noted, such as the inability to proceed with checkout if the item quantity was zero and the requirement to manually tick agreement boxes before placing an order. While these may not be functional bugs, they suggest potential usability or UX design limitations that could hinder a seamless user experience. According to [10], information systems should facilitate the efficient delivery and management of information; these issues imply that the system has yet to fully optimize this objective. Similarly, [11] highlights the importance of procedure integration in system design—an area that still requires refinement, particularly in how users navigate product search and display pages.

Furthermore, a usability assessment using the System Usability Scale (SUS) was conducted to gather user perceptions of the website's functionality and ease of use. The SUS questionnaire was distributed to nine respondents, all of whom had interacted with or shown interest in outdoor gear rentals. Despite the relatively small sample size, the evaluation yielded a SUS score of **78.89**, which is considered "**Acceptable**" and corresponds to a **grade B** on the usability scale, as outlined by Bangor et al. This indicates that while the website performs well and is user-friendly, there is still room for enhancement to reach higher standards of excellence and user satisfaction.

Overall, the website L3 Adventure has succeeded in establishing a solid foundation as a web-based outdoor rental platform. Both front-end user features and back-end admin functionalities are well implemented. Future improvements should focus on enhancing the user interface, refining search functionalities, and eliminating minor interaction barriers to deliver a more intuitive and seamless rental experience.

6. Conclusion

The outdoor equipment rental website provides convenience in rental transactions for users, allowing them to rent from anywhere without having to visit a physical store. For the owner, the website makes it easy to monitor rented items and record transactions that can be summarized for reports. Inventory and pricing management can be done automatically through the website, making financial organization easier. However, improvements are needed in several areas: explanation of the goods receipt procedure, addition of additional services, invoice and report formats. Further research can explore the impact of additional features and design improvements on user satisfaction and operational efficiency. Additionally, the use of technologies such as AI for personalization and data analysis for inventory management and marketing strategies is also worth further investigation.

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