
Design and Build a Web-Based Purchasing Information System using Agile Methods at Darma Store

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ABSTRACT

Increased electronic media can help business efficiency in customer service and sales. The implementation of Business to Customer (B2C) focuses on operational improvements which include developing more effective marketing strategies providing more responsive and personalized customer service which aims to improve customer experience and strengthen long-term business relationships. Software implementations are designed to improve operational processes, optimize workflows and minimize time required. This research aims to design and build a web-based online ordering and purchasing information system at the Darma Building Store. The method used in this research is software development. Agile Software Development uses agile methods which are very efficient and convincing in recognizing changes and higher customer satisfaction. The programming language used is Hypertext Preprocessor (PHP) with the Laravel framework. This research hopes that a web-based online ordering and purchasing information system can help the Darma Building Store manage inventory, increase operational efficiency, and making it easier for customers to make purchases. This system has several online ordering features, purchase reports and sales reports. This system is expected to help stores manage inventory, increase operational efficiency, and make it easier for customers to make purchases.

Keywords: Bisnis to Customer (B2C); Blackbox testing; Laravel; Method Agile; Website

INTRODUCTION

Electronic commerce is the term used to describe e-commerce. It refers to the use of the internet and electronic media to trade products and services (Jain, Arya, & Malviya, 2021). The development of the most profitable electronic media is subject to change based on a number of variables, including customer tastes, market demand, and technological developments. The number of devices continues to register significant growth in the electronic media sector.

The use of electronic media as a trading method is currently gaining the upper hand. This is reinforced by the statement (Putri, 2019) that the use of electronic media makes it easier for people to open businesses with ease and a wider range, more and more business people, both well-known and middle-class, are using the internet to conduct sales transactions rather than having to spend a lot of money to build a physical store. Thus, it can be said that the use of electronic commerce methods is able to maintain low initial costs as well as lower operational costs compared to conventional methods.

The enhancement of electronic media can help business efficiency in customer service and sales. Business to Customer (B2C) implementation focuses on operational improvements that include developing more effective marketing strategies providing more responsive and personalized customer service aimed at improving the customer experience and strengthening relationships.

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LITERATURE REVIEW

Various studies have been conducted regarding the design of web-based online purchase ordering information systems to support business people, but business needs are covered thoroughly. The research that has been done aims to help business people by creating developing a sales information system that produces computerized transactions and sales efficiency ((Putri, 2019) dan (Rahmawati & Fatmawati, 2020)). The subject of research on sales information systems with efficiency and make it easier to manage item data, payments and purchase and sales reports. In this study, it involves users making transactions and Superadmin to manage the transaction process.

The methods used to create information systems vary in the approaches used. The approach varies depending on the complexity of the system to be designed. The waterfall method has become one of the popular approaches in developing software (Ahmadar, Perwito, & Taufik, 2021) and (Gultom & Maryam, 2020) The methods used are also different various can be applied including the use of the Prototype method (Haliza, Ainnur, & Effendi, 2024), Iterative Method (Novriansyah, Aknuranda, & Purnomo, 2019), the Spiral method (Hermawan & Fauzi, 2021), Agile Method (Rahmana, Putra Alwansyah, Luthfi Suryalaksono, & Priyawati, 2023), UML method (Rambe et al., 2020) and SDLC (Umaroh, Priyawati, Susanto, Arodah, & Sujarwo, 2023). In research methods there is no universal procedural model (Thesing, Feldmann, & Burchardt, 2021). The stages carried out in each research method have a specific role to achieve the ultimate goal. The method used by researchers Agile method there are several stages of Product Planning, Iteration Planning, Design, Development and Testing (Nuroji, 2023). The most effective and flexible software development method is Agile (Maezar et al., 2021).

Designing an information system, various programming languages can be used according to the needs and characteristics of the project. The choice of programming language has its own advantages and disadvantages. Hypertext Preprocessor (PHP) programming language is a technology specifically designed for web development where code is executed on the server side (Hermawan & Fauzi, 2021). use of MySQL database as a form of design (Abdussalaam & Ramdani, 2022).

The selection of Codeigniter and Laravel frameworks shows differences in performance, with Codeigniter having a higher average time and speed value compared to Laravel (Renaldo Prasena & Sama, 2020). Codeigniter framework is a framework that has the fastest execution compared to other frameworks (Muqorobin & Rais Rozaq Akbar, 2022). Laravel framework supports increasing the effectiveness and performance of website developers (Gede Handika & Purbasari, 2018). Researchers use the XAMPP database and PHP programming language. Combining categorization programs that make data collection more structured and centralized. This information system was built with the Laravel framework and designed using Bootstrap and Visual Studio Text Editor.

Information system testing there are several System Usability Scale (SUS) method tests used to quickly evaluate the level of usability of a system by considering the context of assessment: effectiveness, efficiency, and user satisfaction (Finanda & Fatmawati, 2019). Testing information systems with Blackbox Testing Method testing software that tests the functionality of the application without regard to the internal structure or workings of the system, Testing there are levels Software, unit, integration, system, acceptance and application testing from a user perspective (Badrul, 2021). The WhiteBox method testers need to have the ability to analyze the source code in depth and identify which parts of the code do not function properly or do not comply with the specifications that have been set Testing (Praniffa et al., 2023) in this study was carried out using the Blackbox and SUS methods.

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METHOD

The research methodology used to develop information systems is the agile method. The agile method involves transparent information sharing, effective collaboration in development, and stakeholders working together to carry out development (Nuroji, 2023). The stages of the Agile method process can be seen in Figure 1 below:

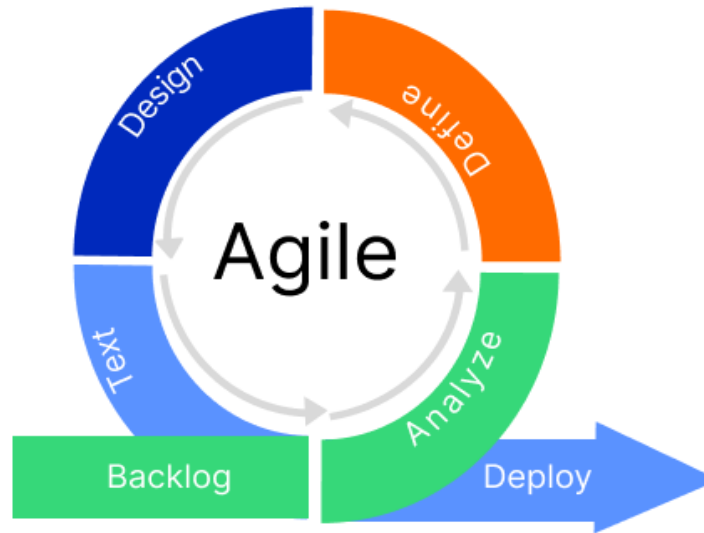


Figure 1. Agile method

In general, the Agile methodology can be used in the following steps when creating TB Darma information:

Planning

Identify needs related to the e-commerce information system of building stores to understand the needs that must be met by the information system used to run building stores online. Planning the target users of e-commerce websites used by electronic media to reach a vast market. Designing a case study of customer needs to determine the intensity of building stores and potential users of the e-commerce system. The identification method collects data by interviewing related parties to find out what needs will be designed in the Darma Building Store sales system. Data will be collected by observation to analyze the places studied that are directly related to the problems studied.

Iteration Planning

Planning for the next iteration, Determining the features to be developed in each iteration. Completing tasks in the iteration that will be determined and prioritized from the product backlog. Developing and testing the product in stages in short cycles. System planning will determine the selection of features to be designed and the criteria for features that must be updated for continuous development. At the planning stage, the software quality will be prioritized.

Design

Perform system design using a prototype-based approach that allows for rapid and iterative development. Based on identified needs, design initial wireframes or mockups of the system.

Use Case Diagram

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Use a case diagram of the design of the Darma Building Store sales information system. Use a Case diagram to understand the functionality of the interaction system between the Actor and the system and know its functionality. The use case has three roles: Superadmin and User. Actor Super Admin is an actor who has full access to the website. Manage stock, user and admin data, and sales reports; then actor Admin is an actor who has access to add, delete, and update items on the website, view sales reports, and The ctor User has access to view and Buy items. Use the case diagram on the Darma Building Store website. Details of the Usecase Diagram can be seen in Figure 2 below:

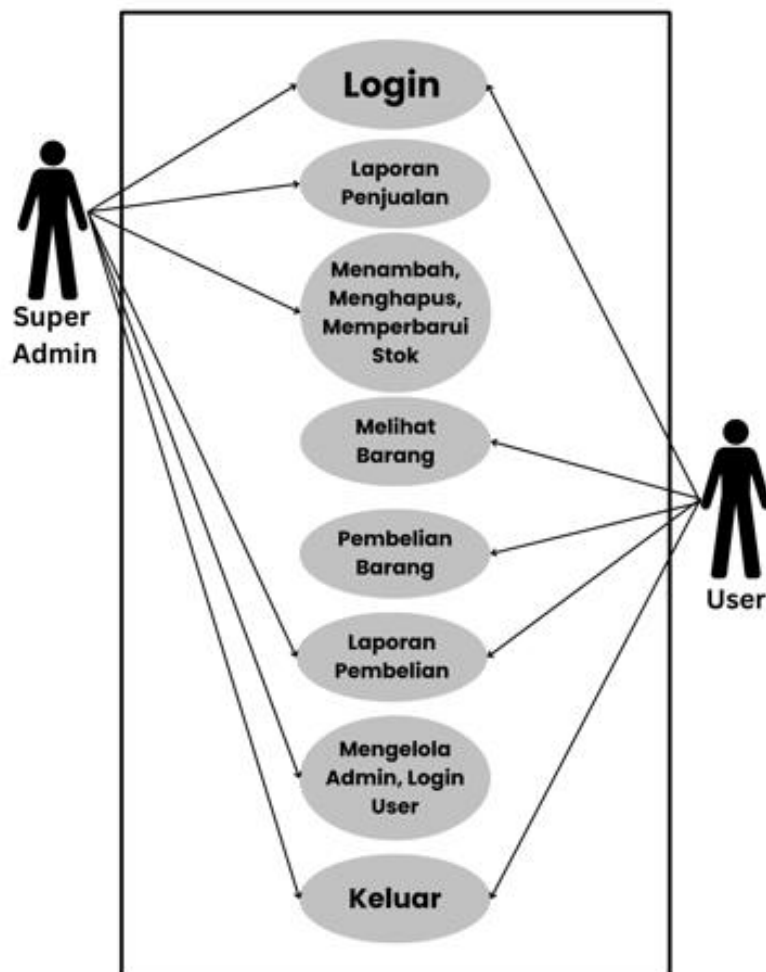


Figure 2. Use Case Diagram

Activity Diagram

Activity Diagram is understanding the workflow of a system. Describes each step of the process, starting from the activities carried out.

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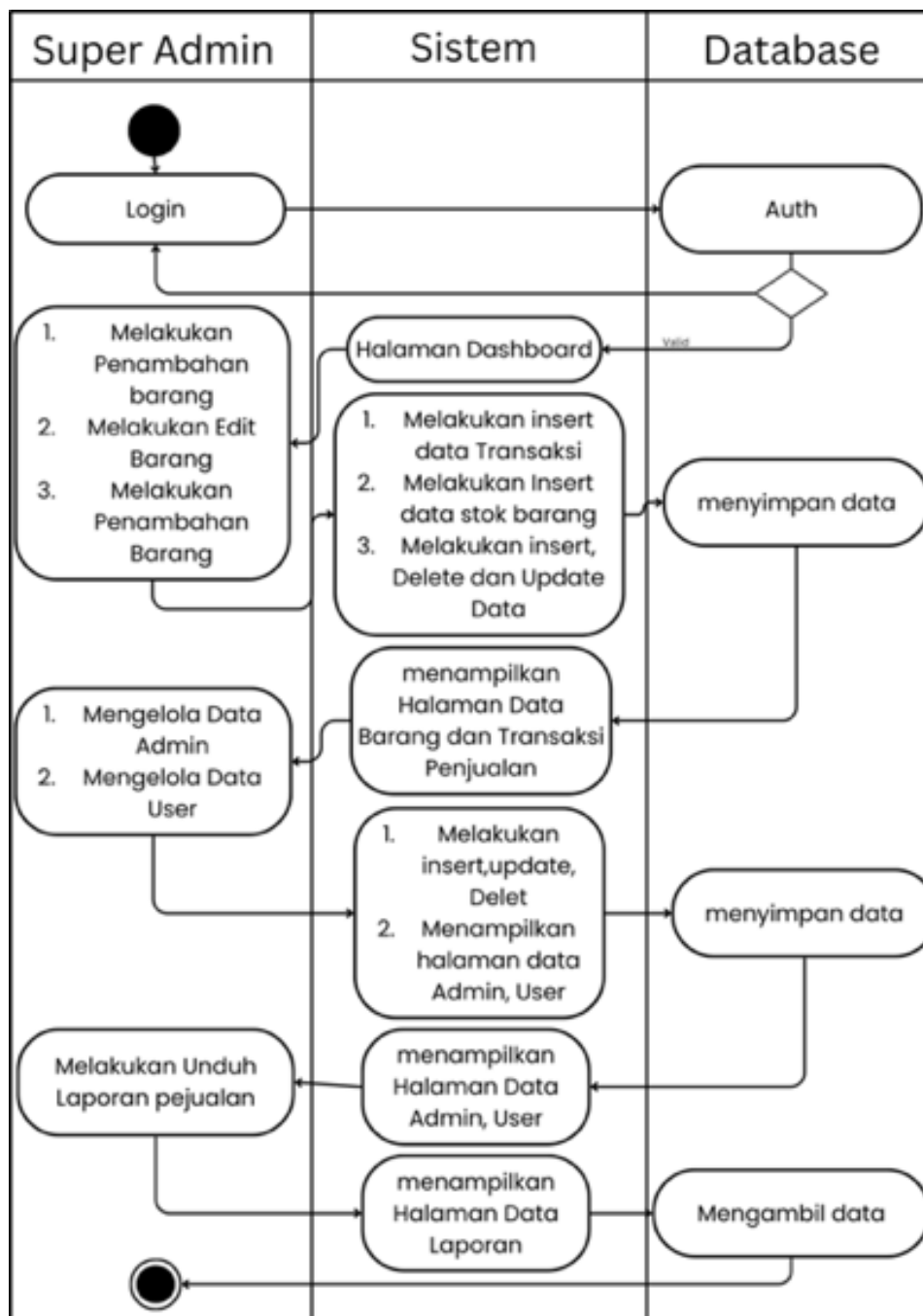


Figure 3. Activity Diagram

Figure 3 explains the Super Admin flow, namely Adding, Changing, and Deleting Stock. The Super Admin can also manage Admins and Users.

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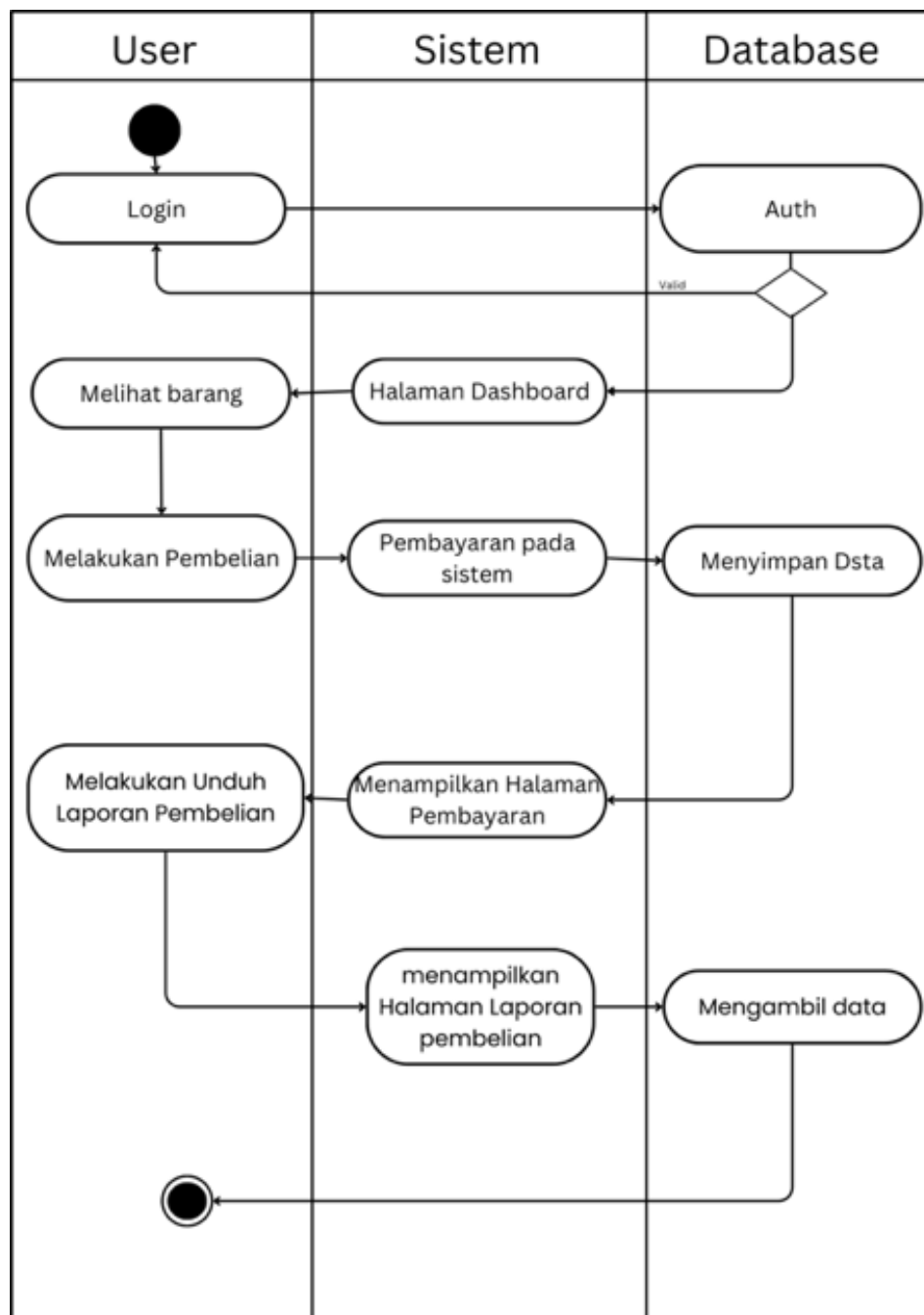


Figure 4. User activity diagram

Figure 4 explains that users have access rights to view and purchase the information system on the Darma store website.

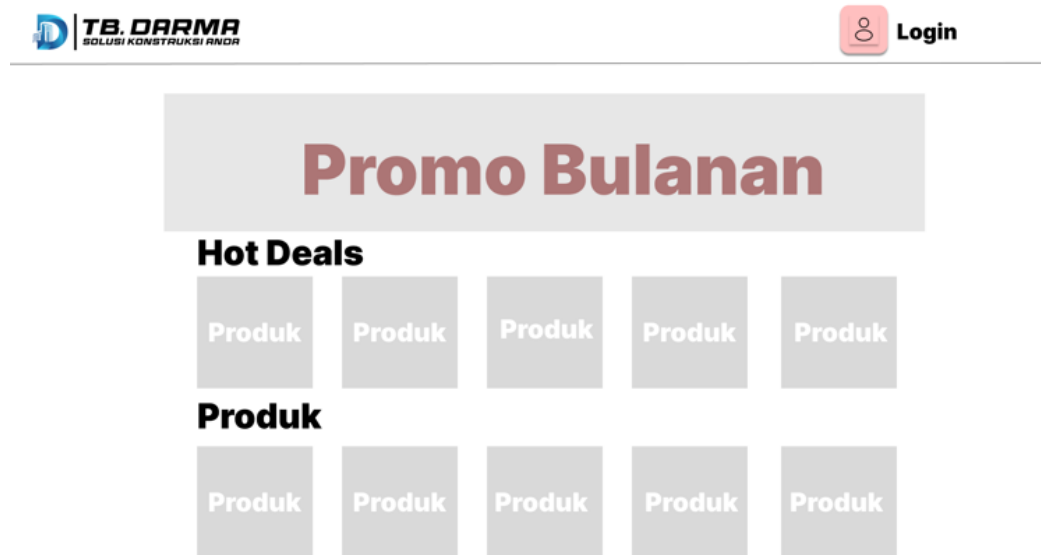
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Wireframe

Representing designed visuals in wireframe designs using the Figma application. Collection of wireframes from dashboards, admin dashboards, super admin dashboards, and login pages.



Picture 6. User dashboard on the main page

Figure 6 shows the dashboard page for users to purchase products. Features available in the User dashboard include Hot Deals to see the best-selling products.

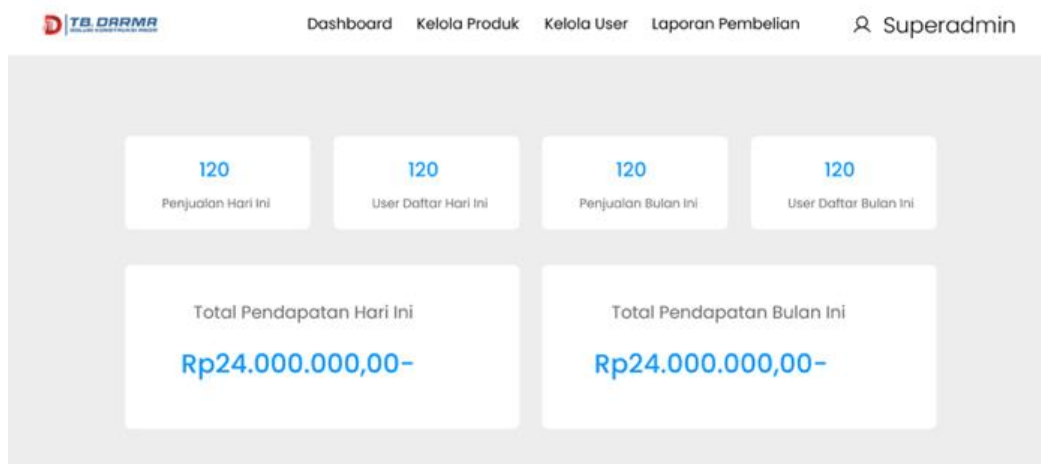


Figure 7. Superadmin Dashboard

Figure 7 shows the Superadmin dashboard page for managing admins users can view sales reports.

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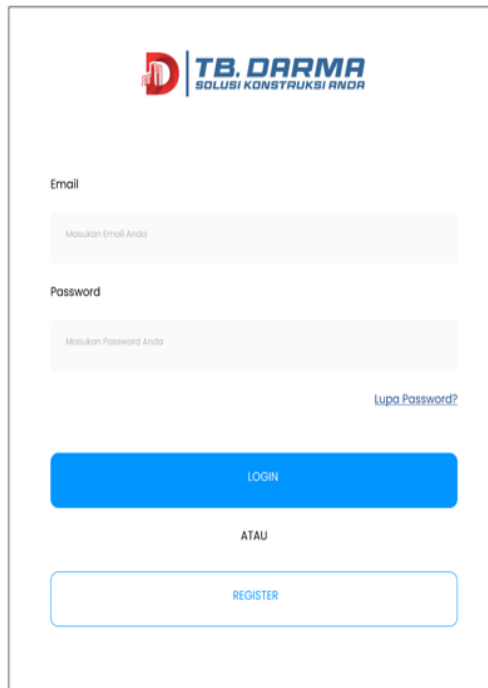


Figure 8. Login page

Figure 8 shows the login dashboard page to determine the Superadmin and User.

Development

Developers are informed about service improvements by customers. In the system testing step, determine whether or not it meets the requirements (Made Widiarta, Mulyanto, & Sutrianto, 2023). Realizing the features that have been planned in literacy. The information system will be developed using the Hypertext Preprocessor (PHP) programming language, Javascript, the XAMPP database for the database and website development using the Laravel framework, the application that will be used for Visual Code software development.

Testing

Conduct continuous testing during the development process, which is carried out in an integrated manner during the development cycle. Integrated testing is testing carried out continuously throughout the software development process. The system will test for 1-2 weeks. The system will continue to conduct continuous testing during the implementation phase to ensure that the developed features function as expected and meet user needs (Badiwibowo Atim & Korespondensi, 2024).

Helps identify and fix bugs earlier to produce higher quality software. Reducing the risk of identifying and fixing bugs early can help reduce the risk of product failure, which will cause losses to the system. The Testing Phase, which will increase customer satisfaction with high-quality software and meet user needs, increases customer satisfaction—testing carried out thoroughly on the system using the Blackbox and SUS methods.

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RESULT

At the results and discussion stage, the research has succeeded in developing and implementing a Building Material sales information system, with a case study focusing on Darma Building Store. This system is designed to improve efficiency and accuracy in sales transactions.

Login Display Results

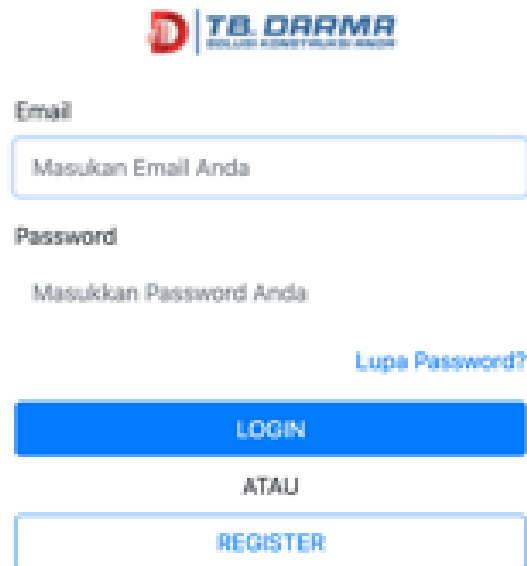


Figure 9. Login Page

Figure 9. On the login page, there are 2 entities: Superadmin and User. To log in, you can go to the login page and input your username and password.

Superadmin Page Results

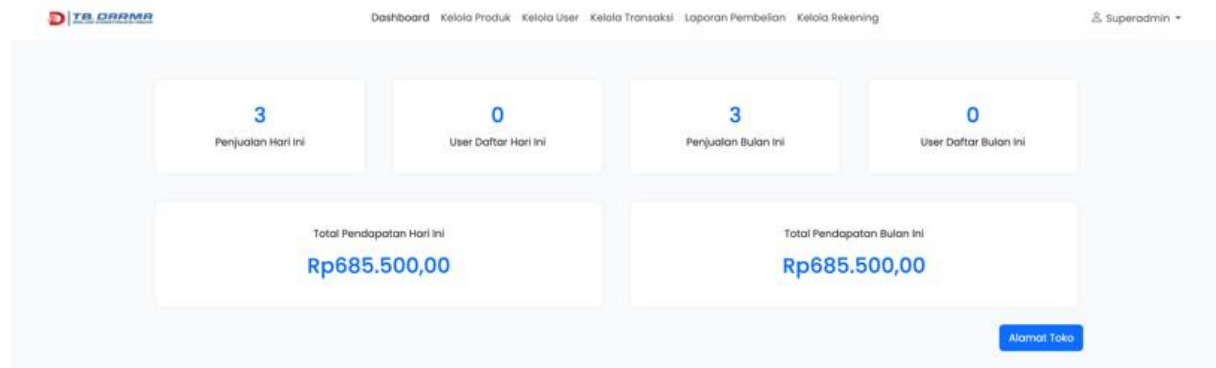


Figure 10. Superadmin Dashboard Page

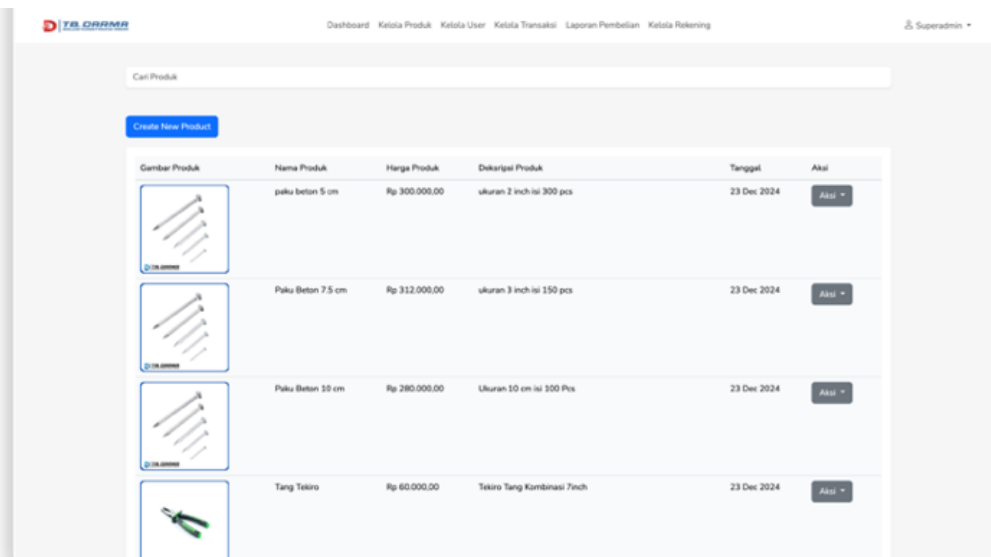
Figure 10 The SuperAdmin page can display usage data directly from the system. On this page, it displays Manage products, Manage transactions, Purchase reports, and Manage accounts, which are managed by the Super Admin.

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Manage Products Page Results

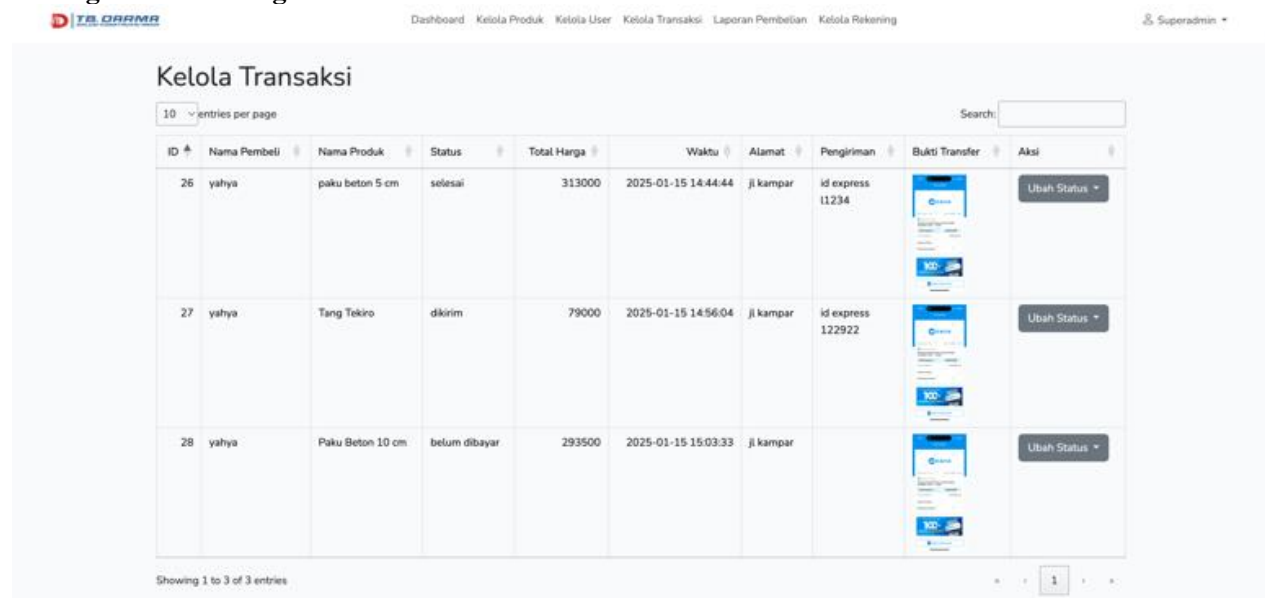


Gambar Produk	Nama Produk	Harga Produk	Deskripsi Produk	Tanggal	Aksi
	paku beton 5 cm	Rp 300.000,00	ukuran 2 inch-lai 300 pcs	23 Dec 2024	Aksi
	Paku Beton 7.5 cm	Rp 312.000,00	ukuran 3 inch-lai 150 pcs	23 Dec 2024	Aksi
	Paku Beton 10 cm	Rp 280.000,00	Ukuran 10 cm-lai 300 Pcs	23 Dec 2024	Aksi
	Tang Tekiro	Rp 60.000,00	Tekiro Tang Kombinasi Finch	23 Dec 2024	Aksi

Figure 11. Product management page

Figure 11 shows the results on the Product Management page, showing data containing products and adding, editing, and deleting actions.

Manage Products Page Results



ID	Nama Pembeli	Nama Produk	Status	Total Harga	Waktu	Alamat	Pengiriman	Bukti Transfer	Aksi
26	yahya	paku beton 5 cm	selesai	313000	2025-01-15 14:44:44	ji kampar	id express 11234		Ubah Status
27	yahya	Tang Tekiro	dikirim	79000	2025-01-15 14:56:04	ji kampar	id express 122922		Ubah Status
28	yahya	Paku Beton 10 cm	belum dibayar	293500	2025-01-15 15:03:33	ji kampar			Ubah Status

Figure 12. Manage products page

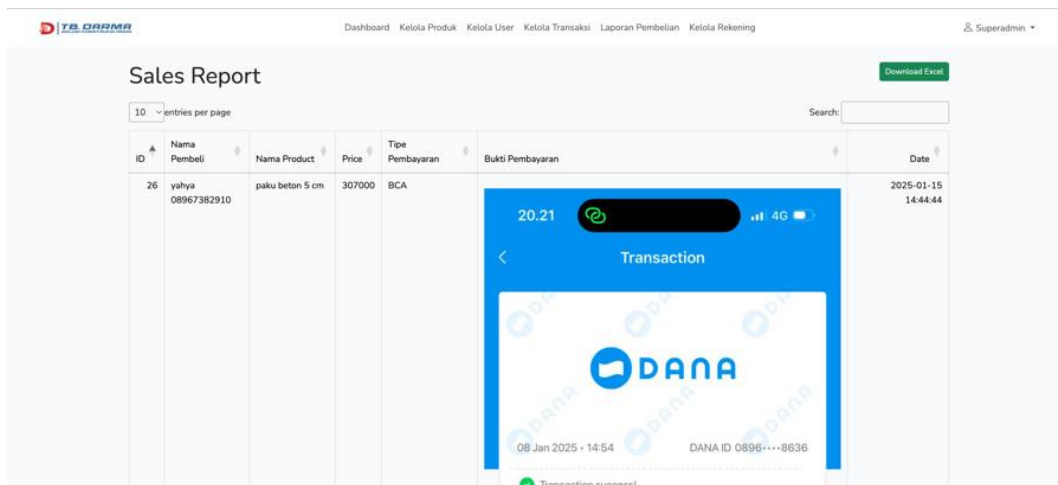
Figure 12, the results on the Manage Transaction page display the data entered from the user to the super admin. Actions that can be managed in terms of the process include inputting shipments and canceling.

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Sales Report Page Results



ID	Nama Pembeli	Nama Product	Price	Tipe Pembayaran	Bukti Pembayaran	Date
26	yahya 08967382910	paku beton 5 cm	307000	BCA		2025-01-15 14:44:44

Figure 13. Sales report page

Figure 13. The results on the sales report page display data containing transactions that have entered sales details and print sales reports in Excel format.

User Dashboard Page

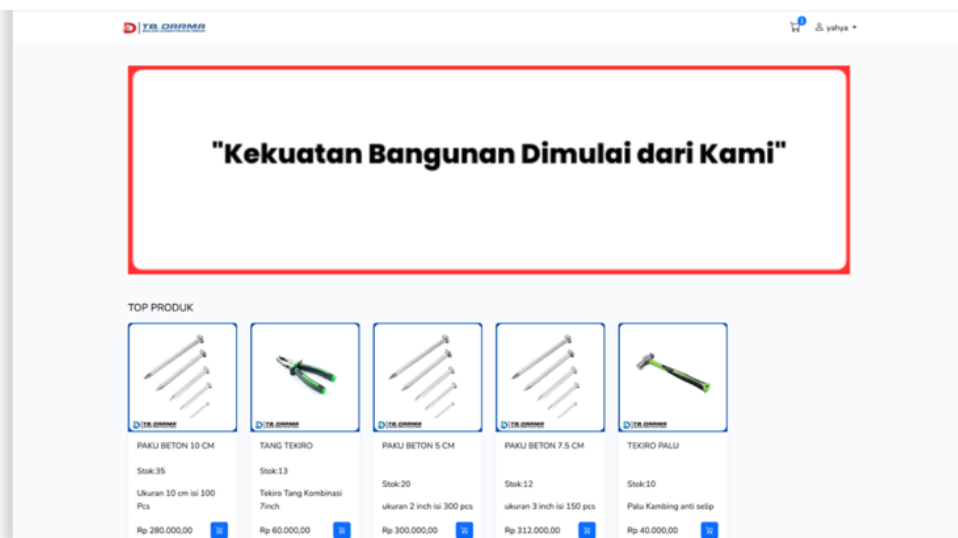


Figure 14. User Dashboard Page

Figure 14 shows the dashboard page displaying products for the user role, users can perform actions including purchasing products, managing profiles, and viewing purchase history.

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DISCUSSIONS

System Testing Results

Blackbox Testing

Blackbox testing is carried out to ensure that every feature in the system functions as it should. In this process, every feature for various user roles is thoroughly tested by interacting with the system. This interaction includes clicking buttons, filling out forms, and other similar inputs. This approach aims to evaluate the system's response to various inputs. Blackbox emphasizes evaluating system functions according to the specified needs without showing the internal code structure of the system (Maspupah, 2024). The results of the processing flow, running without problems and meeting the expected functionality, can be seen in Table 1.

Table 1. Blackbox testing

Usecase	Kondisi	Harapan	Hasil
<i>Login</i>	Tombol <i>login</i>	<i>Login</i> berhasil dan masuk ke halaman dashboard	<i>Valid</i>
<i>Logout</i>	Tombol <i>Logout</i>	<i>Login</i> tidak berhasil	<i>Valid</i>
Mengelola data Produk	Tombol Menambah, mengedit dan menghapus Produk	Produk di simpan ke database, produk bisa di edit dan di hapus yang ada di database	<i>Valid</i>
Mengelola data transaksi penjualan	Tombol ubah status mengelola pengiriman	Menambah data status pengiriman (proses, selesai, dibatalkan)	<i>Valid</i>
Mengelola transaksi penjualan	mengelola data transaksi	Mencetak laporan transaksi masuk	<i>Valid</i>
Mengelola rekening	Tombol tambah rekening	Menuju ke form menambah, edit dan hapus	<i>Valid</i>
Menambahkan Produk ke kranjang	Tombol keranjang	Menambah data dalam halaman keranjang ada produk	<i>Valid</i>
Tambah dan hapus produk di kranjang	Mengelola produk di kranjang	Di halaman keranjang bisa menambah dan hapus produk	<i>Valid</i>
Mengelola data User	Mengelola data diri di halaman edit profil	Halaman edit profil dapat menambah, mengedit, menghapus data	<i>Valid</i>

System Usability Scale

System Usability Scale (SUS) testing is an evaluation method used to measure the usability and performance of a system based on user experience. This method is a questionnaire with an answer scale from 1 to 5, which includes the following options: strongly disagree (STS) = 1, disagree (TS) = 2, neutral (Neutral) = 3, agree (S) = 4, and strongly agree (SS) = 5. This test aims to ensure that the system works according to user expectations and functions optimally. The following is the calculation steps for the results of the System Usability Scale (SUS) test based on (Ependi, Kurniawan, & Panjaitan, 2019)

- For statements on the instrument with odd numbers, the answer scale is reduced by 1.
- For statements on the instrument with even numbers, the value of five is reduced by the answer scale on the instrument.
- The assessment is conducted using a scale of 0 to 4, where 4 is the best answer.
- The answers are added, then the results are multiplied by 2.5.

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e) The average value is calculated based on the answers from all respondents using the testing instrument.

The System Usability Scale (SUS) formula that complies with this standard will be applied through a series of questions given to respondents, as explained in Table 2. The table contains ten main questions used to evaluate user satisfaction with the system.

Table 2. System Usability Scale testing

No	Pertanyaan	Skala
1	Saya merasa sistem ini mudah digunakan	1 – 5
2	Saya merasa sistem ini sulit digunakan	1 – 5
3	Saya perlu waktu untuk memahami sistem ini	1 – 5
4	Saya merasa fitur-fitur pada sistem ini berjalan dengan semestinya	1 – 5
5	Saya merasa ada banyak hal yang tidak konsisten (tidak serasi pada sistem ini)	1 – 5
6	Saya merasa sistem ini membingungkan	1 – 5
7	Saya merasa sistem ini bermanfaat bagi saya	1 – 5
8	Saya merasa sistem ini dapat menampilkan informasi dengan cepat	1 - 5
9	Saya berpikir akan menggunakan sistem ini lagi	1 - 5
10	Saya perlu membiasakan diri terlebih dahulu sebelum menggunakan sistem ini	1 - 5

The questionnaire results were filled out by 30 respondents. The questionnaire data processing was carried out based on the information contained in table 3.

Table 3. Results obtained from the questionnaire

Reponden	Skor Hasil Hitung										Jumlah	Nilai (Jumlah x 2.5)
	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10		
Responden 1	2	2	2	1	2	2	2	2	2	2	19	48
Responden 2	2	2	2	2	3	3	3	1	1	1	20	50
Responden 3	3	2	3	2	3	2	1	2	3	2	23	58
Responden 4	4	4	4	4	4	4	4	4	4	4	40	100
Responden 5	4	4	4	4	4	4	4	4	4	4	40	100
Responden 6	4	0	4	0	4	0	4	0	4	0	20	50
Responden 7	3	3	4	4	4	2	4	3	3	4	34	85
Responden 8	3	4	4	4	4	4	4	4	4	4	39	98
Responden 9	4	3	3	4	4	3	3	4	3	3	34	85
Responden 10	4	4	4	3	4	3	4	4	4	4	38	95
Responden 11	3	3	3	3	3	3	2	3	4	3	30	75
Responden 12	3	2	3	3	3	3	4	4	3	2	30	75
Responden 13	3	2	3	3	3	2	2	3	3	3	27	68
Responden 14	3	4	3	2	3	2	3	4	3	1	28	70
Responden 15	4	2	3	3	3	3	3	3	3	3	30	75
Responden 16	3	3	4	3	4	3	3	4	3	2	32	80

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Responden 17	3	3	3	3	2	2	4	2	3	1	26	65
Responden 18	3	3	3	3	4	0	3	3	4	1	27	68
Responden 19	4	0	4	0	4	0	4	0	4	0	20	50
Responden 20	4	2	3	3	3	4	3	4	3	3	32	80
Responden 21	3	3	2	4	3	3	4	3	4	3	32	80
Responden 22	4	2	1	2	3	3	3	4	2	3	27	68
Responden 23	3	2	3	3	4	3	3	4	3	3	31	78
Responden 24	3	3	4	2	4	4	3	4	2	3	32	80
Responden 25	3	3	3	3	3	3	3	3	3	3	30	75
Responden 26	3	2	1	2	4	2	3	1	1	1	20	50
Responden 27	3	2	2	3	4	3	2	2	4	1	26	65
Responden 28	4	1	2	3	4	3	2	2	3	2	26	65
Responden 29	3	3	2	1	2	3	3	3	3	3	26	65
Responden 30	3	2	3	1	3	2	3	3	3	3	26	65
											72,083333	
Skor Rata-rata (Hasil Akhir)											33	

After testing the data obtained, it was processed to determine the evaluation results. The sum of the results obtained was a score of 72.08, which can be seen in Table 3.

After getting the SUS score results, they can be checked using the SUS Score assessment standards for the tested assessments listed in figure 15.

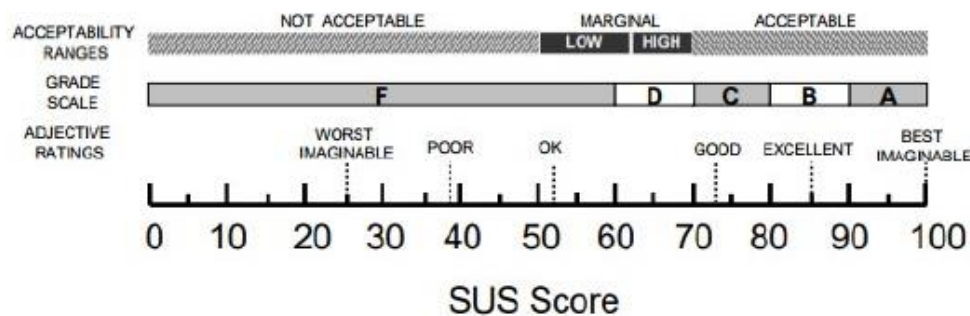


Figure 15.SUS Table Score (Marli'aini & Anggoro, 2024)

As shown in Table 4, the final score obtained by using the SUS method was 72.8, which is in the good category.

CONCLUSION

Based on the results and discussions explained previously, it can be concluded that the use of information system applications is made to assist the implementation of the sales transaction system that occurs at the Darma Building Store, which was previously carried out using conventional methods. With this system, the sales transaction process will be more effective and efficient in purchasing. This study aims to design a web-based information system to overcome existing problems. This system is expected to increase the efficiency of data processing, which previously used conventional methods, by utilizing a computerized

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and well-integrated system so that data processing becomes optimal. The information system design uses the Agile method, which is more flexible to change, using the PHP and MySQL programming languages as databases, with a software development methodology that facilitates and accelerates purchases at the Darma Building Store.

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