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Web-Based Sales Force Automation Implementation Using Extreme Programming at CV. Samudra Jaya

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ABSTRACT

The sales process at CV. Samudra Jaya is currently conducted conventionally, relying on manual order recording and daily visit reports. This condition results in a high risk of human error, slow information flow between divisions, and difficulties for management in effectively monitoring salesman performance. This study aims to develop a web-based Sales Force Automation (SFA) system to digitize and automate the company's sales business processes. The system development approach applied is Extreme Programming (XP), encompassing planning, design, coding, and testing phases, selected for its flexibility in adapting to changing client needs. The application is built using the Laravel framework and MySQL database. The result of this research is an integrated SFA system that covers customer data management, salesman territory tracking, sales transaction recording, monthly target management, and automated financial reporting. System testing using the Black Box method demonstrates that all functions operate validly and meet operational requirements. The implementation of this SFA system successfully enhances sales administration efficiency, increases salesman performance transparency, and provides accurate real-time data to support strategic decision-making by management.

Keyword: Sales Force Automation, Extreme Programming, Sales Information System, Web Application, Operational Efficiency.

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1. INTRODUCTION

The rapid development of information technology demands companies to undergo digital transformation to maintain competitiveness and operational efficiency. In the distribution and trading industry, the speed of information flow between the sales team and management is a key factor in business success. One technological solution widely adopted to overcome sales operational obstacles is Sales Force Automation (SFA). The implementation of SFA has been proven to increase sales team productivity by automating repetitive administrative tasks, allowing salespeople to focus more on sales strategies and customer relationships [1], [2], [3].

CV. Samudra Jaya is a distributor company that currently conducts its sales business processes conventionally. Based on initial observations, the process of recording orders, daily visit

reporting, and stock monitoring is still done manually using paper and manual recapitulation. This condition leads to a high risk of human error, delayed information flow from the field to the head office, and difficulties for management in monitoring salesman performance in real-time. Similar problems often occur in companies not yet integrated with digital systems, where administrative inefficiencies directly impact revenue decline and customer satisfaction [4].

To address these issues, a computerized system capable of integrating all sales activities is required. The development of a web-based information system is the appropriate solution as it allows flexible data access from various devices without geographical limitations. A web-based system facilitates the monitoring and reporting processes, which were previously the main obstacles in the manual system [2]. Numerous studies have demonstrated that using web frameworks like Laravel significantly accelerates development and ensures system scalability [5], [6], [7]

In developing this system, the Extreme Programming (XP) method was chosen as the software engineering approach. XP is known as an agile method that emphasizes development speed, intensive communication, and high flexibility towards changing user needs during the development process. The use of the XP method is considered highly relevant for this case study, given the dynamic feature requirements and the need for system completion within a relatively short time while maintaining quality [8]. This study aims to design and build a web-based Sales Force Automation system at CV. Samudra Jaya to improve operational efficiency and sales data accuracy.

2. METHODS

This research applies the Extreme Programming (XP) software development method. XP was selected due to its agile nature, characterized by short development cycles and high adaptability to dynamic user requirements. The XP methodology consists of four primary phases: Planning, Design, Coding, and Testing. This approach enables the development team to deliver product releases incrementally while maintaining high software quality [8], [9], [10].

2.1 Planning

The planning phase began with business requirement identification through interviews with the management of CV. Samudra Jaya. The primary focus was to understand the current sales workflow and the obstacles faced in manual recording. The results of this requirement analysis were documented as user stories, which describe the features to be built, such as stock management, daily visit reporting, and sales recapitulation.

2.2 Design

Based on the identified requirements, the system design was executed using the Unified Modeling Language (UML). The diagrams employed include Use Case Diagrams to depict user interactions with the system and Class Diagrams to design the database structure. The user interface (UI) was designed to be simple yet functional (user-friendly) to facilitate ease of use for salesmen in the field [11], [12].

2.3 Coding

The implementation phase involved translating the design into program code. The system was built as a web-based application using the PHP programming language with the Laravel Framework. The selection of Laravel was based on its MVC (Model-View-Controller) architecture, which separates business logic from the presentation layer, thereby

simplifying code maintenance and development. MySQL was utilized as the database management system for storing transaction and inventory data [13], [14].

2.4 Testing

The final phase is software testing to ensure the system operates according to specifications. The testing method employed is Black Box Testing, which focuses on input and output functionality without examining the internal code structure. This testing aims to detect interface errors, functional errors, and database access errors before the system is deployed to users [15], [16], [17].

3. RESULTS AND DISCUSSION

This section presents the research findings, which include the implementation of the Sales Force Automation (SFA) system and the testing results. The system is built using the Laravel framework and MySQL database, integrating five key user roles: Salesman, Marketing Admin, Purchasing Admin, Accounting Admin, and Director.

3.1 System Implementation

The Salesman module is the core of field operations, designed with a mobile-responsive interface to facilitate mobility. This module allows salesmen to perform daily check-ins for attendance and manage sales transactions in real-time. The interface simplifies the order creation process, allowing salesmen to input customer orders and monitor installment statuses directly from their devices. The visualization of the Salesman Dashboard, which displays performance metrics and transaction menus, is presented in **Figure 1**.

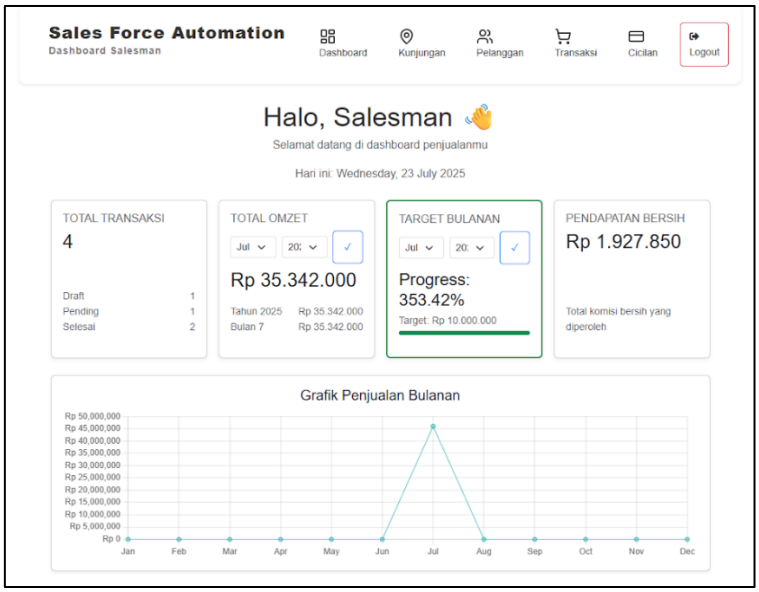

Figure 1. Salesman Dashboard Interface

For strategic management, the Marketing Admin role is equipped with a territory management feature. The system allows the admin to map specific customers to a designated salesman, ensuring clear coverage areas and preventing overlapping visits. This Salesman Mapping feature is crucial for maintaining operational efficiency and equitable distribution of leads. The interface for managing salesman territories is shown in **Figure 2**.

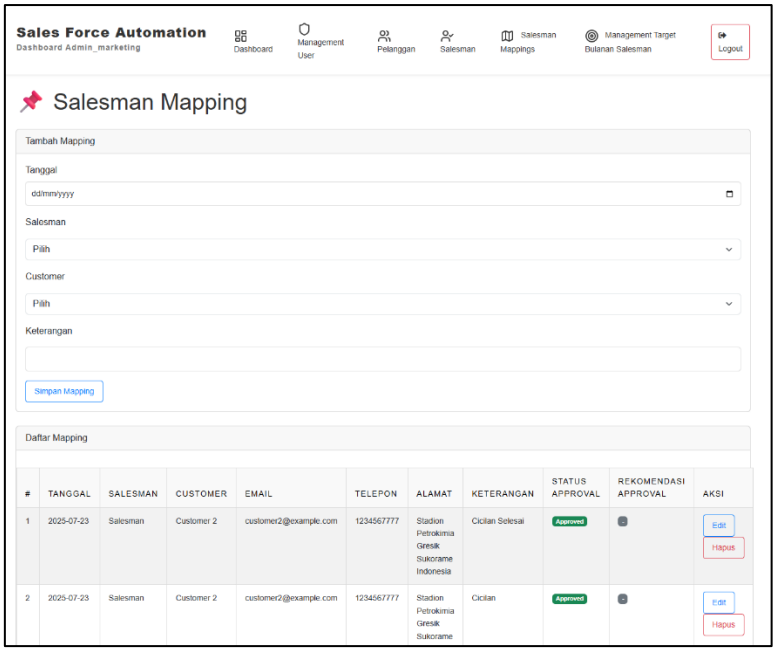

Figure 2. Salesman Mapping Interface

Inventory control is managed through the Purchasing Admin module. This role oversees the product master data and monitors stock availability. A key function of this module is the validation of Purchase Orders (PO). When pre-ordered items arrive at the warehouse, the admin updates the transaction status from "Pending" to "Ready," triggering the delivery process. The dashboard for the Purchasing Admin can be seen in **Figure 3**.

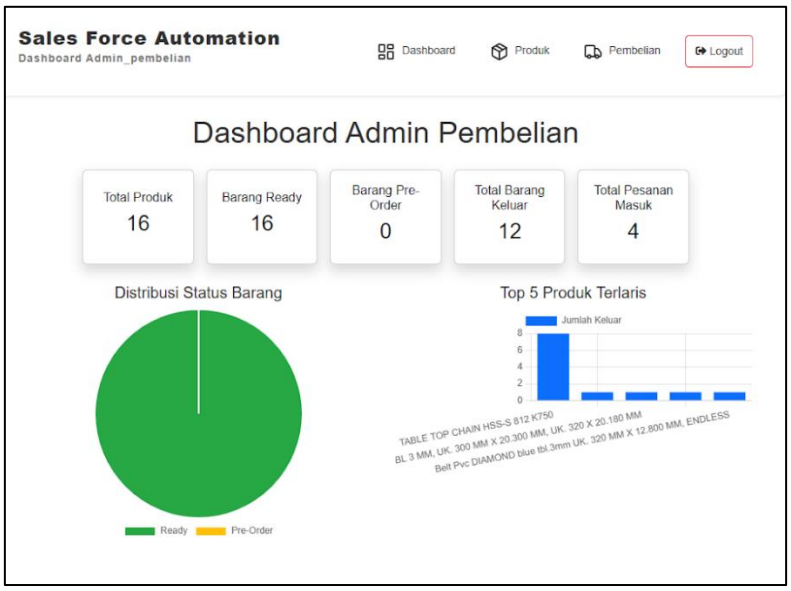

Figure 3. Purchasing Admin Dashboard

The financial aspect of the sales process is handled by the Accounting Admin. This module introduces a Customer Evaluation feature, which acts as a decision support system to assess customer creditworthiness based on payment history. Additionally, the admin can monitor accounts receivable and calculate salesman commissions automatically. **Figure 4** illustrates the Customer Evaluation interface used for credit scoring.

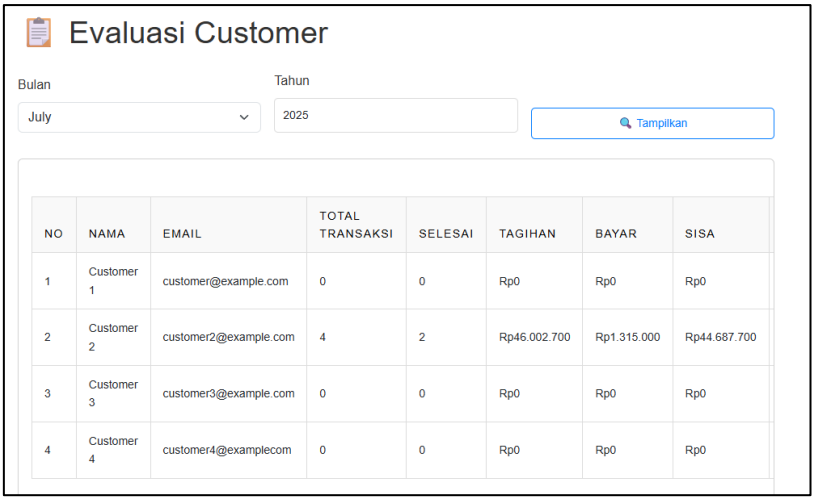

Figure 4. Customer Evaluation Interface

Finally, the Director module serves as an executive monitoring tool. Unlike operational roles, the Director has view-only access to comprehensive reports, including total revenue trends, best-selling products, and salesman performance analytics. This real-time data access supports faster strategic decision-making without the need for manual reporting. The executive dashboard display is presented in **Figure 5**.

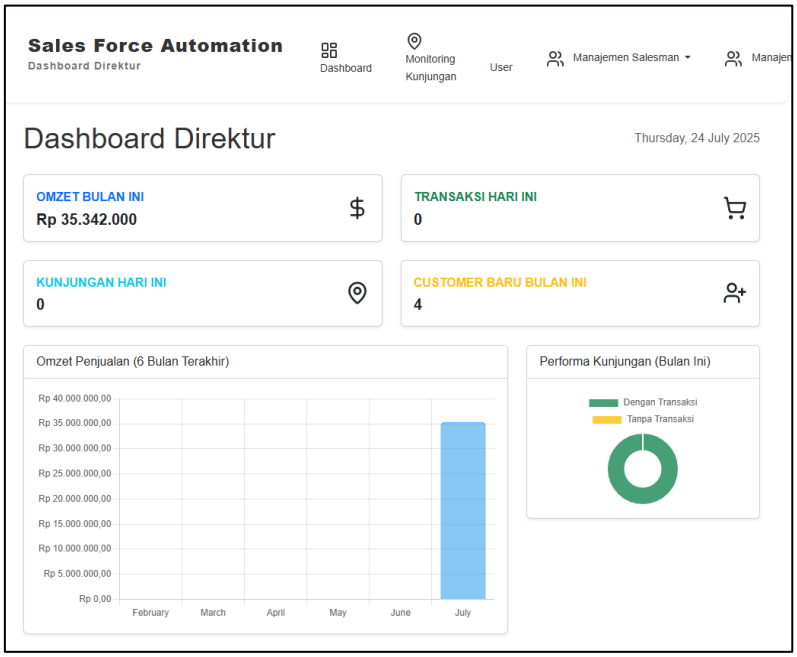

Figure 5. Executive Dashboard

3.2 System Testing

System testing was conducted using the Black Box Testing method to ensure that all functional requirements operate correctly. This testing approach is essential for validating web-based applications to maintain system stability and user trust, as highlighted in [16]. The testing covered 50 distinct test scenarios, ranging from user authentication, transaction processing, to report generation.

Table 1. Summary of Black Box Testing Results

No	Test Scenario	Module	Expected Result	Status
1	Auth Login	System	User credentials validated; redirected to role-specific dashboard.	Valid
2	Reset Password	System	Password reset via OTP email executed successfully.	Valid
3	Admin Marketing Dashboard	Admin Marketing	Dashboard displayed correctly for Admin Marketing role.	Valid
4	User Management	Admin Marketing	Successfully create, edit, and delete user accounts for all roles.	Valid
5	Customer Management	Admin Marketing	Successfully create, edit, view, and delete customer data.	Valid
6	New customer Approval	Admin Marketing	System evaluates and sets approval status (approve/reject) for new customers.	Valid
7	Salesman Mapping Assignment	Admin Marketing	Successfully map customer to salesman and set visit date.	Vallid
8	Salesman Mapping Management	Admin Marketing	Successfully create, edit, and delete mapping data.	Valid
9	Monthly Target Management	Admin Marketing	Successfully set, edit, and delete monthly targets for salesmen.	Valid
10	Customer Approval (From Salesman)	Admin Marketing	Modify approval status manually or based on system recommendation.	Valid
11	Old Customer Evaluation	Admin Marketing	View and edit evaluation data submitted by Admin Accounting.	Valid
12	Old Customer Mapping	Admin Marketing	Map existing approved customers to salesmen in the area.	Valid
13	Salesman Dashboard	Salesman	Dashboard displayed correctly with salesman-specific metrics.	Valid
14	Customer Creation	Salesman	Create new customer data (status: pending approval).	Valid
15	View Salesman Mapping	Salesman	Display mapping list assigned by Admin Marketing.	Valid
16	Update Transaction	Salesman	Successfully update transaction details from the field.	Valid
17	Update Transaction Products	Salesman	Add/edit products in a transaction based on availability.	Valid
18	Select Transaction Type	Salesman	Select type: Installment, Pay Later, or Cash (Lunas).	Valid

19	Installment Transaction	Salesman	Create installment transaction with tenor & Midtrans payment.	Valid
20	Pay Later Transaction	Salesman	Create 'Pay Later' transaction and log salesman attendance.	Valid
21	Cash Transaction	Salesman	Create 'Cash' transaction, pay via Midtrans, log attendance.	Valid
22	No-Transaction Visit	Salesman	Update visit log without transaction (attendance only).	Valid
23	View Visits	Salesman	Display visit history based on assigned mapping.	Valid
24	Installment Management	Salesman	View active/completed installments & process payments.	Valid
25	Admin Purchasing Dashboard	Admin Purchasing	Dashboard displayed correctly for Admin Purchasing role.	Valid
26	Product Management	Admin Purchasing	Create, edit, view, and delete product data.	Valid
27	Procurement Process	Admin Purchasing	Update 'Pre-Order' product status to 'Ready' after procurement.	Valid
28	Admin Accounting Dashboard	Admin Accounting	Dashboard displayed correctly for Admin Accounting role.	Valid
29	Old Customer Management	Admin Accounting	Evaluate completed transactions & send data to Marketing for mapping.	Valid
30	Installment List	Admin Accounting	View comprehensive list of customer installments.	Valid
31	Payment History	Admin Accounting	View history of monthly installment payments.	Valid
32	Receivables Recap	Admin Accounting	Display total receivables (piutang) per customer.	Valid
33	Transaction Details	Admin Accounting	View detailed transaction logs (salesman & customer).	Valid
34	Salesman Commission	Admin Accounting	View commission calculated from installment margins.	Valid
35	Commission Recap	Admin Accounting	View total monthly commission & transaction count per salesman.	Valid
36	Sold Products Report	Admin Accounting	Display total sales volume per product.	Valid
37	Best Seller Products	Admin Accounting	Identify and display top-selling products.	Valid
38	Director Dashboard	Director	Dashboard displayed correctly with executive summaries.	Valid
39	Visit Monitoring	Director	Monitor productive vs. non-productive salesman visits.	Valid

40	User List View	Director	View all registered system users.	Valid
41	Salesman View	Director	View detailed salesman data (territory & status).	Valid
42	Commission View	Director	View detailed commission calculations.	Valid
43	Target Monitoring	Director	Monitor monthly target vs. actual achievement per salesman.	Valid
44	Customer View	Director	View list of valid customers (registered by Sales/Admin).	Valid
45	Customer Evaluation View	Director	View transaction history and evaluation scores per customer.	Valid
46	Product List View	Director	View product catalog and stock levels.	Valid
47	Transaction View	Director	View all transaction details across the company.	Valid
48	Installment View	Director	View installment status, total paid, and remaining debt.	Valid
49	API Photon Komoot	System	Autofill address for customers/salesmen using Photon API.	Valid
50	Haversine Implementation	System	Calculate radial distance to ensure valid visit mapping.	Valid

3.3 Discussion

The implementation of the SFA system has brought significant improvements to the business processes at CV. Samudra Jaya compared to the previous conventional methods.

1. **Digitalization and Efficiency :** The shift from manual note-taking to a centralized digital database has eliminated data redundancy. Previously, sales data had to be manually re-entered by the admin, which was prone to human error. The new system allows real-time data entry by salesmen, ensuring data accuracy and accelerating the order processing time. This efficiency improvement aligns with findings in [18], which demonstrates that implementing a web-based sales and purchasing system significantly reduces administrative delays and improves data accuracy.
2. **Enhanced Monitoring and Accountability :** The Salesman Mapping and Visit Monitoring features provide management with visibility into field activities that was previously impossible. The Director can now differentiate between productive visits (resulting in transactions) and non-productive ones, enabling more effective strategic planning. This real-time visibility addresses the common issue of information asymmetry often found in manual sales processes [1].
3. **Real-Tima Decision Making :** With centralized data, financial reports and sales performance metrics are available instantly. Decision-makers no longer need to wait for end-of-month manual recapitulations to assess company performance. Furthermore, the integration of customer evaluation scoring provides a data-driven

basis for credit decisions, supporting the need for analytical tools in modern sales systems as suggested by [19].

CONCLUSION

Based on the research and implementation conducted, it can be concluded that the Web-based Sales Force Automation (SFA) system for CV. Samudra Jaya has been successfully developed using the Extreme Programming (XP) method and the Laravel framework. The system effectively integrates the operational workflows of five key roles: Salesman, Marketing Admin, Purchasing Admin, Accounting Admin, and Director, thereby resolving the issues of data fragmentation and manual redundancy.

The Black Box testing results on 50 distinct scenarios demonstrate a 100% validity rate, confirming that all functional requirements—ranging from mobile order input by salesmen to executive monitoring by the Director—operate without errors. The implementation of this system significantly enhances business efficiency by accelerating order processing time, ensuring real-time stock and payment updates, and providing a data-driven Customer Evaluation feature for credit risk management. For future development, it is recommended to expand the system into a native mobile application (Android/iOS) to further optimize field operations and integrate Artificial Intelligence (AI) for more advanced sales forecasting..

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