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The Development of Web-based Sales Reporting Information Systems using Rapid Application Development Method

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***Abstract*—Many studies can be used as references regarding the application of information systems in companies that can optimize business processes. Information Systems can be designed according to the needs of each company. Concerning the company, PT Artindo Pratama Sejahtera is a private company engaged in paint production. One of the problems in business processes at the company is when the sales report activity from the salesperson to the warehouse admin section needs to be recorded in the database because it still uses the short message/chat application media. In addition, the short messages/chats often pile up. Based on the literature review that has been done from previous research, these problems can be overcome by implementing an information system. The purpose and contribution of this research are to optimize business processes in reporting activities so that they become integrated. The output of this research is a website-based Sales Reporting Information System. Before the Information System was implemented at PT Artindo Pratama Sejahtera, functionality testing was carried out by system users using the User Acceptance Test (UAT) method with the black box testing model and obtaining results according to company needs so that they could overcome the problems described earlier.**

Index Terms—*Information System; Sales; Rapid Application Development; Reporting; Website*.

I. INTRODUCTION

According to the information from the official website company profile PT Artindo Pratama Sejahtera, this company is a private company engaged in the production of paint and has 185 employees divided into several sections/divisions, namely: the production department totalling 50 people, then staff (finance, accounting, administration, and warehouse admin) totalling 40, then 65 salespersons and 30 other people are drivers. [1]. At this company, there are several salespersons, and each salesperson has to offer the company's products to stores that target the company, such as in the Tangerang area and several other cities in the vicinity. For the business process to run optimally following the specified targets, it is necessary to monitor each salesperson. The problem currently happening to PT Artindo Pratama Sejahtera is that the sales report process from a Salesperson to the Warehouse Admin section needs to be read optimally and piles up because it is done via a short message/chat application..

As technology develops, business processes in a company are very dependent on technology and based on previous research. An information system can be used to measure employee performance in the form of a website [2]. Research focuses on the Analysis and Design of web-based information systems using UML Diagram designs. It has been successfully made into a web-based information system equipped with a website content management system (CMS) to manage website content [3]. Furthermore, according to research by Susianawati [4], applying an information system in a company for the reporting process can help improve the company's performance, especially in sales. Then, according to research by Rumbiak [5], the appearance of information systems tested using usability testing is also an essential factor so that an information system can be understood and used by users.

Based on the problems described above and the study literature that has been carried out, it can be concluded that these problems can be overcome by optimizing business processes in sales reporting activities using an information system to improve the business processes. The outcome and contribution of

this research is a web-based information system that the warehouse admin can use to optimize sales reporting.

II. METHOD

The Proposed Information System Development will be carried out using the Rapid Application Development (RAD) method because it provides faster development and quality results [6]. The RAD method is easier to implement because development focuses on each development requirement at a time and requires less time. Apart from that, the stages in RAD are structured, and software development can be carried out in a short time with an emphasis on short cycles; more specifically, the software being developed can know the results without waiting a long time [7]. Figure 1 shows the cycles/stages in implementing the RAD method.

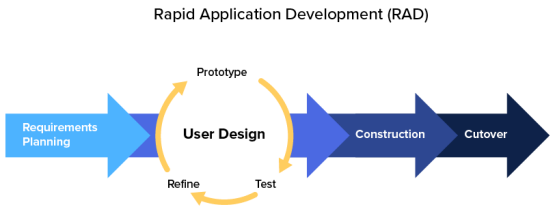

Fig 1. RAD Method

Based on Figure 1, we can see the steps to implement the RAD method, starting with requirements planning, user design, construction, and cutover. The following is a brief explanation of each stage:

a) Requirements Planning:

At the requirement gathering stage, interviews will be conducted to seek user information, design system preparations, and determine what features will be used in the application. Users and analysts will discuss to identify system objectives and be oriented towards solving business problems.

b) User Design:

All the requirements described in the analysis stage will be described in more detail at this stage. From the conditions obtained, it will be transformed into Unified Modelling Language (UML) Diagram in the form of use case diagrams that can describe the main functions of the system to be created and explain the relationship between system users later [8].

c) Construction:

At this stage, the main focus is system development. In the RAD method, users must continue to participate and can suggest changes or improvements as the report progresses. The developer's job is system development, coding, and system testing.

d) Cutover:

Finally, at the last stage in the implementation of RAD, the functional system is tested using the User Acceptance Test (UAT) method [9] with the black-box testing model [10] and will be transferred to the new system and continued with user training. In addition, a comparison will be made between RAD and traditional methods, and as a result, the new system should be able to be implemented in the company

III. RESULT AND DISCUSSION

A. Analysis

The requirements planning is the first stage in the RAD method. At this stage, requirements gathering is done by looking for information from the user, designing the system preparation, conducting interviews, and determining what kind of features will be used in the system. Users and analysts discuss to identify the purpose of the system and oriented toward solving business problems. To make the requirements analysis phase can be understood more clearly, the explanation of the analysis between the current system versus the proposed system will be shown in the form of a comparison table which can be seen in table 1.

Table 1. Analysis of the current system vs the proposed system

No	Type of Analysis	Weakness of current System	Proposed System
1	Performance	Searching the production report data requires a long time, so that the operation will be delayed and not run optimally.	Searching sales report data is done faster than the current systems using the main feature.
2	Economics	Requires cost to print a report using a paper.	Does not use a lot of cost because it uses an system and displayed on the monitor, the production report data is stored in the database.
3	Security	System security is not optimal because it still uses	The security of the proposed online system becomes

		spreadsheet application to process data and no authentication to access the data, so that the sales report data can be seen by unauthorized user.	more optimal due to the authentication and limitation of system user access rights so that the sales report data can be stored properly in the database.
4	Efficiency	It still takes a long time in the process of making a sales report data report.	More efficient because it can directly get sales report according to the specified date and period.

B. UML Diagram

All users (Salesperson, Warehouse Admin, and Sales Manager) can access the system through the login page and access the dashboard. The primary function of the Salesperson actor is shown to be able to access the Input Product Sales, Input Transaction Sales, View Target Sales, View Report Sales, and Print Report Sales. The following actor is the Warehouse Admin, whose primary function is to access the Add Product, Manage Product, and Approve outgoing goods. Furthermore, the Sales Manager actor is shown that he can only perform View Target Sales, View Report Sales, and Print Report Sales. The use case diagram on figure 2 will describe the primary function of the proposed system.

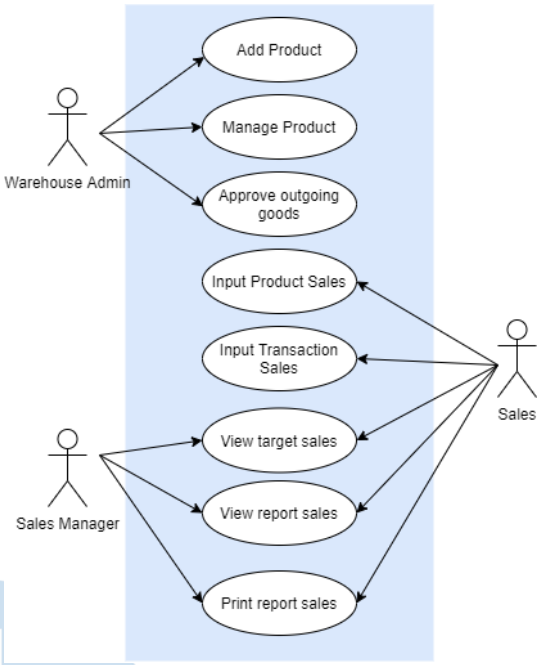

Figure 2. Use Case Diagram

Based on the proposed Use Case Diagram, it will be derived into Activity Diagram in Figure 3:

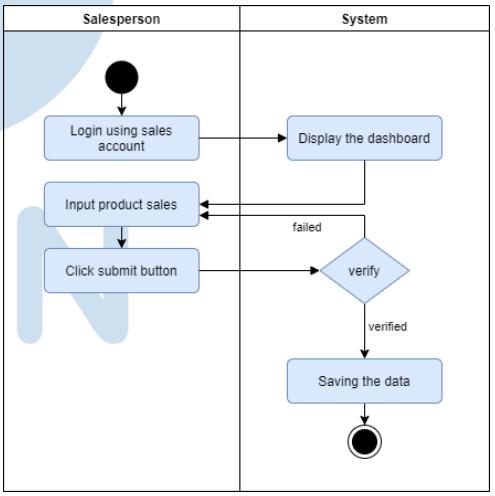

Figure 3. Activity Diagram

Based on the activity diagram image above, we can see user activity, namely salesperson, when they want to input product sales. The process begins by logging in using the salesperson account and each password, and then the system will display the salesperson system dashboard to be able to input sales product input activities and submit them. After the user submits, the system will provide a response in the form of verification to review whether the data entered is correct or not. If everything is correct, the final step in this activity is to save the data.

C. Construction

At this stage, research will be focused on system development. In the RAD method, the users participate and can suggest changes or improvements during system development. The developer's task here is to design, code, and test the system. The system interface design will be carried out using a Figma based on Use Cases and Activity Diagrams. In contrast, coding will be carried out using VS Cove tools as a text editor for the use of the PHP programming language. From Figure 4 to Figure 6, the system user interface will be displayed:

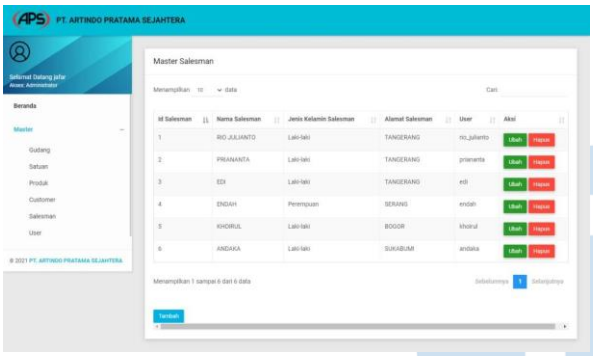

Figure 4. Salesperson (master data) interface

Figure 4 below is the master salesperson data display. Based on the interface from figure 4, the information system can be accessed via a browser (Google Chrome, Mozilla Firefox, Safari, and other browsers) with URL (localhost). In this view, there are several attributes, namely: id and name of the salesman, which functions to find out the ID number and name of the salesman that is inputted as well as the gender and address of the salesman and user, in operation the function consists of an edit and delete buttons which function to change and delete master salesman data, and has a search submenu, displays data, a button to return to the previous page and a button to go to the next page and an add button that aims to add master salesman data.

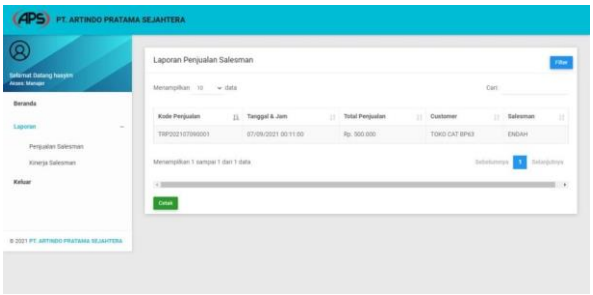

Figure 5. Transaction sales report interface

From the Figure 5, The following is a display of the sales report, which has the following functions: sales id which aims to find out the sales id and date & time, which helps know the date & time of the sale, total sales and the custom functions to find out the total number of sales received by the customer and the name of the salesperson which functions to find out the salesman who inputted data, the previous and next submenus, search and the print button which functions to print the salesman's sales report.

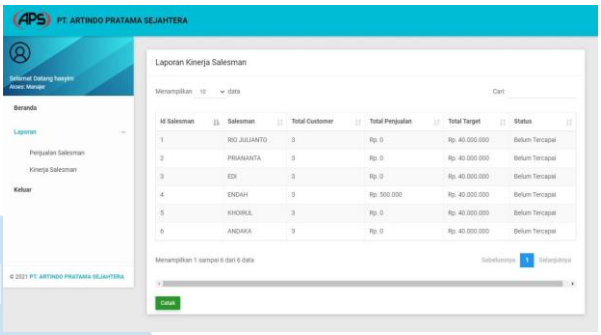

Figure 6. Sales target report interface

From the Figure 6, the following is a display of the salesman's performance report, which has the following functions: id and name of the salesperson, which aims to find out the id and name of the salesman, total customers and total sales to find out the number of customers obtained as well as total sales and total targets function to find out the marks achieved by the salesman, as well as the previous and next submenus, search and the print button which functions to print the salesman's performance report.

The system interface described above can be accessed via localhost on a limited basis on company PCs. Based on the test results, which will be explained in the next stage, the system will be hosted so that it can be accessed widely and at any time.

D. Cutover

This User Acceptance Test (UAT) function is to find out the responders' responses to this design, so a test is carried out by giving 10 question questionnaires related to system functions to 38 responders who are a salesperson that will be using this system, which helpful for answering these questions. The questionnaire is given in the form of a google form and is assessed by the respondents online. The indicators that will become the benchmark can be seen in the table 2:

Table 2. Indicator of each Question's

Indicator	Score	Description
A	5	Excellent
B	4	Very good
C	3	Good
D	2	Bad
E	1	Very Bad

Based on the questions that have been determined to measure the results of system testing, five indicators are determined, namely A, B, C, D, and E, along with their scores and descriptions according to the description in table 2. If the results of the UAT that has been carried out get a lot of score on indicator A, it could be interpreted that the system that has been created has succeeded in answering the needs of the company in accordance with the analysis carried out. Conversely, if the E indicator is the most chosen, then the system created can be categorized as a system that is not suitable for use.

Table 3. UAT Questionnaire

No	Question's	Indicator				
		A	B	C	D	E
1	Is the information system interface display easy to see?	10	26	2	0	0
2	Is the information system menu interface easy to understand?	11	24	3	0	0
3	Does this information system have the appropriate features?	11	18	8	0	0
4	Can this information system search (filter) the desired data?	13	17	5	3	0
5	Can this information system design be easy to manage transactions?	14	17	6	1	0
6	Can a pop-up system help the Interface of this information system?	13	22	3	0	0
7	Is this information system design easy to download transaction reports?	9	17	8	2	2
8	Does this information system help in measuring performance?	14	18	5	1	0
9	Is the design of this information system easy to operate?	15	21	2	0	0
10	Is this information system following the expectation of the company?	13	22	3	0	0

Table 3 showed the 38 salespeople as the respondents and gave scores for each indicator, and then the scores were accumulated to get the cumulative or average score. The results show that most respondents gave high scores on indicators A and B, then for indicator C, there was a moderate score, while for indicators D and E, there were very low scores.

Table 4. Percentage of UAT Questionnaire

Indicator				
A	B	C	D	E
26%	69%	5%	0	0
29%	63%	8%	0	0
30%	49%	21%	0	0
34%	45%	13%	8%	0
37%	45%	16%	2%	0
34%	58%	8%	0	0
24%	45%	21%	5%	5%
37%	47%	13%	3%	0
40%	55%	5%	0	0
58%	34%	8%	0	0

Apart from being in the form of a table of numbers, the results of the UAT test were also converted into percentages to make it easier to understand and process the calculations at a later stage. After carrying out the UAT test and obtaining a score from each indicator, each indicator will be multiplied by the score given to find out the results of the percentage score and average. The results of this calculation will describe the success of the system design against the expectations of the company's needs that have been described in the first stage of this RAD method.

Table 5. Total's of questionnaire answer

No	Question's	Indicator					Total
		A*5	B*4	C*3	D*2	E*1	
1	Is the information system interface display easy to see?	50	104	6	0	0	160
2	Is the information system menu interface easy to understand?	55	96	9	0	0	160
3	Does this information system have the appropriate features?	55	72	24	0	0	151
4	Can this information system search (filter) the desired data?	65	68	15	6	0	154
5	Can this information system design be easy to manage transactions?	70	68	18	2	0	158
6	Can a pop-up system help the Interface of this information system?	65	88	9	0	0	162
7	Is this information system design easy to download transaction reports?	45	68	24	4	2	143

8	Does this information system help in measuring performance?	70	72	15	2	0	159
9	Is the design of this information system easy to operate?	75	84	6	0	0	165
10	Is this information system following the expectation of the company?	65	88	9	0	0	162

An overview of the results from table 5 will be displayed in a brief calculation in table 6. The tests carried out will produce a score to calculate the average value and percentage for each question:

Table 6. Calculations from the questionnaire answer

Question	Average Value	Percentage of Value
#1	160/38 = 4.2	4.2/5x100 = 84%
#2	160/38 = 4.2	4.2/5x100 = 84%
#3	151/38 = 3.9	3.9/5x100 = 79%
#4	154/38 = 4.05	4.05/5x100 = 81%
#5	158/38 = 4.1	4.1/5x100 = 83%
#6	162/38 = 4.2	4.2/5x100 = 85%
#7	143/38 = 3.7	3.7/5x100 = 75%
#8	159/38 = 4.1	4.1/5x100 = 83%
#9	165/38 = 4.3	4.3/5x100 = 86%
#10	162/38 = 4.2	4.2/5x100 = 85%

Finally, the total percentage of UAT has been obtained and can represent the user's assessment of the system. The results of the assessment can be seen in the table, producing a fairly high score on each question which is an assessment indicator in the UAT test shown in table 7:

Table 7. Total of Percentages

Description	Percentages Score
Question #1	84%
Question #2	84%
Question #3	79%
Question #4	81%
Question #5	83%
Question #6	85%
Question #7	75%
Question #8	83%
Question #9	86%
Question #10	85%
Overall Average	82.5%

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IV. Conclusion

Research has been carried out to develop an information system based on the need for digitization in the sales reporting business process at PT Artindo Pratama, a paint manufacturer and distributor company in Indonesia. The Rapid Application Development method has been successfully implemented in the design of a Web Sales Reporting Information System. System testing results produce an average overall score of 82.5%, with a very good score. The sales division can use the system that has been generated to carry out sales reporting activities. The novelty produced in this study is applying the RAD method in designing information systems and testing using UAT to produce the required information system quickly with excellent results. The results of this study also contribute to the company, especially the sales division, in sales force reporting activities.

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