Integrated System Design Of Sales And Production Module Using RAD Method (Case Study: PT Shafira Putri Kreatif)

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Abstract— **PT Shafira Putri Kreatif is a company engaged in the field of fashion and apparel for men and women. In business processes, communication is carried out manually in the form of face-to-face or in-office meetings between subsidiaries. This results in inappropriate or forgotten information on production and sales. Therefore, implementing the ERP module is important to help point problems faced by companies to better control its financial performance. The SDLC Rapid Application Development (RAD) method was used. System design is done by making DFD and ERD. The system design is coded using the PHP programming language with the Laravel framework and SQL database. The result of the research is a website-based application that is integrated with the sales module which can assist in viewing and managing transaction data from subsidiaries.**

Keywords— *ERP; Sales Module; Design and Build; SDLC RAD; Website*

I. INTRODUCTION

ERP or Enterprise resource planning is a method used by the industry in carrying out business processes more efficiently by sharing information for business processes and running on a system that is integrated with each other in carrying out company operations, production or distribution [1].

PT Shafira Putri Kreatif is a company engaged in the field of fashion and apparel for men and women. PT Shafira Putri Kreatif has several subsidiaries that carry out certain fashion manufacturing fields, these companies consist of: Ina Butik (engaged in perfecting dresses, kebaya and hijab), Lumonggasari (making clothes with minimalist and elegant fashion styles) and Ads Collection (producing various uniforms for work, school and other general fashion clothing).

PT Shafira Putri Kreatif in conducting communication between subsidiaries is done manually, in the form of face-to-face or in-office meetings. From the existing business processes, the information submitted is not appropriate and the production business processes at PT Shafira Putri Kreatif are not fully running properly or according to needs. From the existing system, a new system is needed to help provide production and sales information at PT Shafira Putri Kreatif by creating an ERP system that can be used as a guide in carrying out business processes by implementing best practices so as to increase productivity, reduce waste and improve product quality and create data standards. and information through uniform reports [1].

Based on the description that has been explained, in this study carried out ERP development using the RAD (Rapid Application Development). The RAD method is a linear sequential software development process model that emphasizes a very short development cycle (range of 60 to 90 days). The development of the RAD model will shorten the development time in the software development cycle between system design and implementation [2]. In the RAD method there are Requirements Planning, Design Workshop (Design Process) and Implementation (Implementation) stages [3]. In conducting research, this method is needed to design several important problem points faced by the company, as well as the solutions offered in the modernization of the PT Shafira Putri Kreatif system.

II. METHOD

In this study, a reference or comparison of previous research was carried out in finding material and avoiding material similarities.

Research that carried out ERP implementation was carried out by Fakung Rahman on report presentation. PT Surya Citra Television has succeeded in implementing SAP by creating a design that applies ERP concepts and financial reports. The system uses SAP R/3 which can present financial reports quickly, accurately, facts and objective [4].

Subsequent research using the Rapid Application Development (RAD) method was conducted by Jansen Wiratama, Hari Santoso and Sobiyanto. In this research, the dashboarding management system executive monitoring project progress determines project feasibility using the forecasting method approach (Case Study: PT Rajawali Mas Mandiri). In this study, it was successful in making dashboards for project monitoring using the RAD software development method. The research results are used as a support in project monitoring activities for corporate executives at PT Rajawali Mas Mandiri [5].

Research conducted by Ririn Ikana Desanti, Carolyn Feiby Supit, Andree E. Widjaja made an employee recruitment and appraisal application using the RAD software development method with a prototype approach. The results of the research resulted in a web-based employee recruitment and appraisal application at PT. XYZ which was developed using the RAD method. This application can help (support) the HRD department [6].

In this study using the RAD software development method in the design of an integrated sales module system. The RAD method was chosen because the RAD method is suitable for projects that require a short time, namely the range of 60 to 90 days and produces a system that meets the immediate needs of the customer [1]. The RAD method has the stages described in Figure 3.1 for carrying out the design of an integrated sales module system at PT Putri Shafira Kreatif.
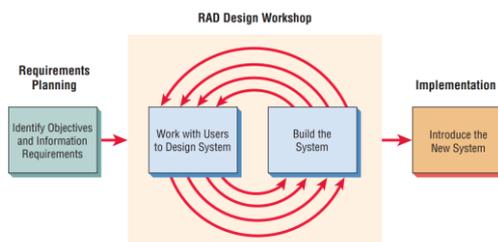
Fig 1. RAD method

The RAD design for designing the ERP system required for PT Shafira Putri Kreatif has stages which can be explained as follows:

A. Requirements Planning

At this stage it is carried out to identify the needs, limitations and objectivity of the system to be built by collecting data at PT Shafira Putri Kreatif. This stage is carried out through an interview process and distributing questionnaires that aim to obtain information about ongoing business processes and problems that occur at PT Shafira Putri Kreatif. After collecting data, a solution was found, namely the design of an integrated sales module system with the RAD method at PT Shafira Putri Kreatif.

B. RAD Design Workshop

a) Design System

At this stage, modeling is carried out based on the results of data collection in the previous stage. In this study the modeling that was carried out was DFD design and database design by making the ERD system to be built.

b) Build the System

At this stage, the implementation of the system is carried out into the coding program and database. In this study the database used is SQL and the PHP programming language with the Laravel framework

C. Implementation

At this stage, implementing a system that has been approved by PT Shafira Putri Kreatif. At this stage it is customary to provide feedback on the system that has been made and to obtain approval for the system.

III. RESULT AND DISCUSSION

In conducting this research using the RAD software development method. In system design, DFD (Data Flow Diagram) and ERD (Entity Relationship Diagram) design is made. The coding is done using the PHP programming language with the Laravel framework and SQL database.

A. Requirements Planning

Requirements planning is a stage for defining what system requirements are needed in building a system that is integrated with the sales module at PT Shafira Putri Kreatif using the RAD method. In this study, the needs analysis consists of functional requirements and non-functional requirements.

Based on the results of interviews and data analysis through distributing questionnaires, the functional requirements of the sales module integrated system at PT Shafira Putri Kreatif using the RAD method are obtained, namely:

1) Admin

Admin is an actor assigned to the center who can manage transaction data from 3 subsidiary branches of PT Shafira Putri Kreatif. Following are

the functional requirements of the admin actor namely:
1. Log in
2. Manage supplier data
3. Manage customer data
4. Manage branch data
5. Manage unit data
6. Manage category data
7. Manage product data
8. Print purchase data
9. Print sales data

2) Branch Admin

The branch admin is an actor in charge of managing product data, in this case, a subsidiary of PT Shafira Putri Kreatif. The following are the functional requirements of the branch admin actor, namely:
1. Log in
2. Manage product data
3. Manage sales data
4. Manage purchasing data
5. Print purchase data
6. Print sales data

Non-functional requirements are stages for defining what devices are needed in building a system, both software and hardware. The following are the non-functional requirements of the system to be built, namely:

1) Hardware Requirements
   Hardware is a device in physical form with specifications to run the system. The following hardware is used as follows:
   a. Computer or Laptop
   b. Intel Core i3 processor
   b. 3.4GB of RAM
   c. 500GB hard drive
   d. Mouse and Keyboard

2) Software requirements
   Software requirements is an application that is needed to be able to build the system to be made. The software used is:
   a. Operating System: Windows 10
   b. Databases: SQL
   c. Web Server: XAMPP
   d. Web Browsers: Mozilla, Chrome
   e. Text Editor: Visual Studio Code
   f. Draw.io

B. RAD Design Workshop

The design process is the stage for creating a design based on the results of the needs analysis. In this study, the design for the integrated system design of the sales module at PT Shafira Putri Kreatif was made using the RAD method, namely making a system design in the form of data flow diagrams (DFD) and entity relationship diagrams (ERD).

Data flow diagrams or context diagrams are diagrams that describe the entire process in the system in the sales module integrated system design at PT Shafira Putri Kreatif with the RAD method which is depicted in Fig 2.
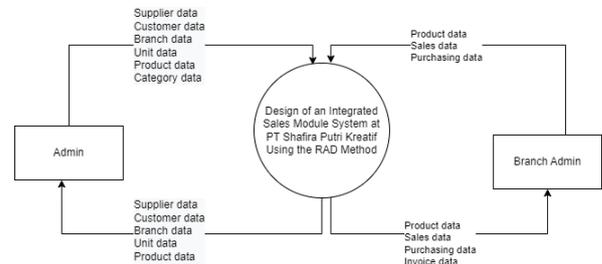

Fig 2. DFD Level 0 Website Sales Module of PT Shafira Putri Kreatif

From Fig 2. DFD Level 0 it can be explained as follows:
a. The admin inputs data on the sales module integrated system design application at PT Shafira Putri Kreatif. The data input is supplier data, customer data, branch data, unit data, product data and category data. Furthermore, the admin can see the results of the data that has been input.
b. The branch admin inputs product data, sales data and purchase data into the system. From this process, the results of product data, sales data and purchase data are obtained.
c. The sales module integrated system collects data on invoices that have been carried out by the branch admin and displays the results to the admin and branch admin.

From DFD Level 0 or context diagram then DFD Level 1 is described as a continuation of DFD Level 0. DFD Level 1 in this study is depicted in Fig 3.
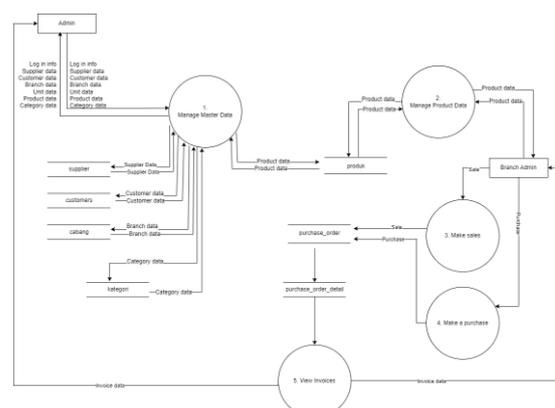

Fig 3. DFD Level 1 Website Sales Module of PT Shafira Putri Kreatif

Explanation of Fig 3. DFD Level 1 will be explained as follows:

a. DFD Level 1 for process number 1 is used to manage master data. In process number 1 it involves an external entity admin. Admin can perform the login process, input supplier data, customer data, branch data, category data and product data on the system which is stored in data store suppliers, customers, branches, categories and products.

b. DFD Level 1 for process number 2 is used to manage product data. In process number 2 it involves an external entity admin and branch admin. Admin and branch admin input product data on the system which is stored in the product data store.

c. DFD Level 1 for process number 3 is used to make sales. In process number 3 it involves an external entity admin branch. The branch admin inputs sales data on the system which is stored in the purchase_order and purchase_order_detail data stores.

d. DFD Level 1 for process number 4 is used to make purchases. In process number 4 it involves an external entity admin branch. Branch admins who want to make purchases by inputting purchase data into the system, then the data is stored in the purchase_order and purchase_order_detail data stores.

e. DFD Level 1 for process number 5 is used to view invoices. Invoice data is generated in the system based on purchase_order and purchase_order_detail store data. Invoice data can be seen by external entity admins and branch admins.

Database design is done by making ERD used to describe entities and relationships between entities contained in the system. Each entity in the ERD has attributes, the ERD used is depicted in Fig 4.
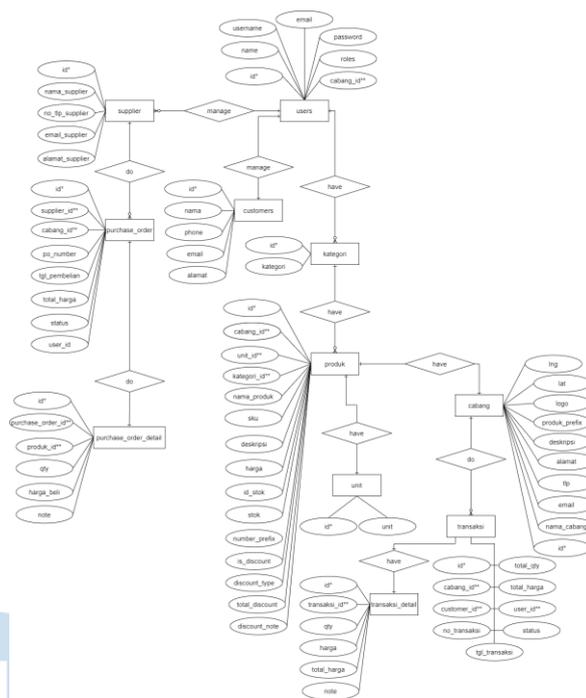
Fig 4. ERD Website Sales Module of PT Shafira Putri Kreatif

C. Implementation

1) Admin

When a user logs in as an admin actor, he has access rights/functions, namely managing user data, suppliers, customers, branches, units, categories, products, purchase orders (PO) and sales and logout.
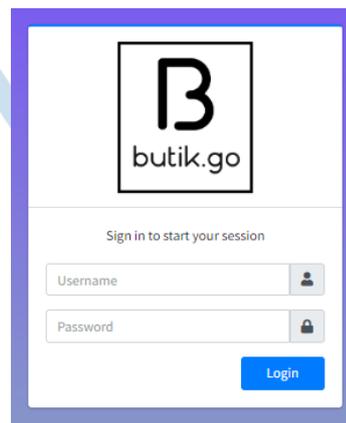
Fig 5. Login Page

When the admin has successfully logged in, they will be directed to the dashboard page as shown in Fig 6.
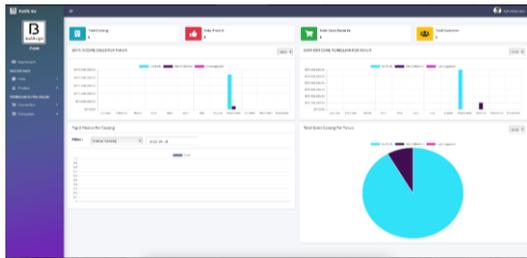
Fig 6. Dashboard

Admin can manage user data such as add, edit and delete user data. display of user data page can be seen in Fig 7.
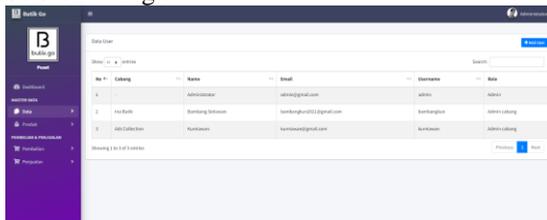
Fig 7. User Data Page

Views for managing category data can be seen in Fig 8. On the category data page you can add, edit and delete category data.

Fig 8. Category Data Page

The product page is used by the admin to view product data and manage product data such as adding, editing and deleting product data as shown in Fig 9.
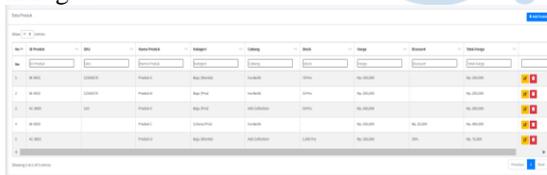
Fig 9. Product Data Page

The purchase order data page is a page that displays information on purchases made by the company's branches which can be seen in Fig 10. On this page you can manage purchase order data.

Fig 10. Purchase Order Data Page

The sales data page is a page that displays sales information made by the company's branches for products available at PT Shafira Putri Kreatif which can be seen in Fig 11. On this page you can add sales data and view sales details.

Fig 11. Sales Data Page

Print purchase data is the action used by the admin to print the selected purchase data by pressing the "Print" button. Then the system will display the selected purchase data for printing which can be seen in Fig 12.
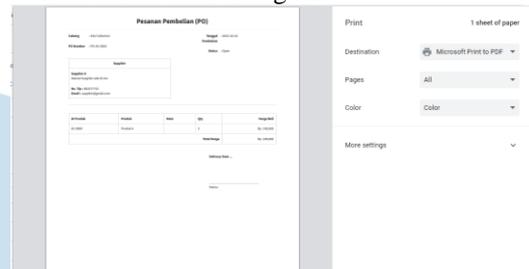
Fig 12. Purchase Data Print Page

2) Branch Admin

When a user enters as a branch admin actor, he has access rights/functions, namely managing customer data, products, purchase orders (PO) and sales and logout.

On the login page, the branch admin is used to enter the system by entering the username and password in Fig 13.
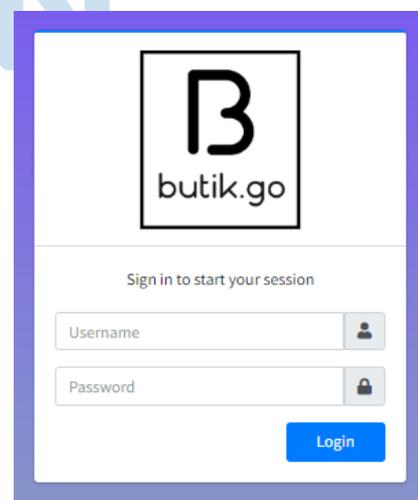
Fig 13 Login Page

The dashboard page shown in Fig 14 is a page that displays brief information regarding the number of branches, products, total sales for this month, total customers, income data graphs, sales outcome data per year and the top 5 products per branch.
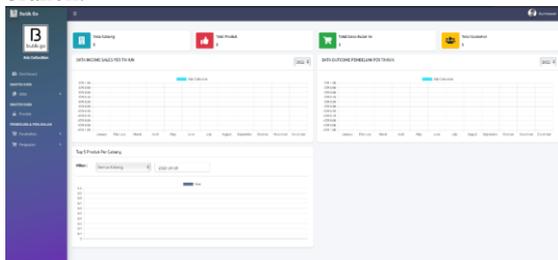
Fig 14. Dashboard Branch Admin

The customer data page is a page that displays customer data information consisting of name, telephone number, email and address. On the customer data page, the branch admin can manage customer data, namely adding, editing and deleting customer data. Implementation of customer data pages can be seen in Fig 15.

Fig 15. Customer Data Page

The product data page is a page that displays available product information. On the product data page, the branch admin can manage product data, namely add, edit and delete product data. Product data page implementation can be seen in Fig 16.

Fig 16. Product Data Page

The purchase data page is a page that displays information on purchase data made by the branch admin for PT Shafira Putri Kreatif. Implementation of purchasing data pages can be seen in Fig 17.

Fig 17. Purchase Order Data Page

Add purchase data is a page that is used by the branch admin to add purchase data made to PT Shafira Putri Kreatif's products. Add purchase data by pressing the "Add PO" button. Then the system displays a pop-up select a branch and selects the Ads Collection branch which can be seen in Fig 18.

Fig 18. Add Purchase Data page

In Fig 19 it is used to add purchasing data such as products purchased, date of purchase, supplier and purchase status.

Fig 19. Successful Add Purchase Data Page

Branch admins can add purchased product data by pressing the "Add Product" button. Then the system displays the add product form and press the "Add Product" button to save the product data. Implementation of the added product page on purchases can be seen in Fig 20.
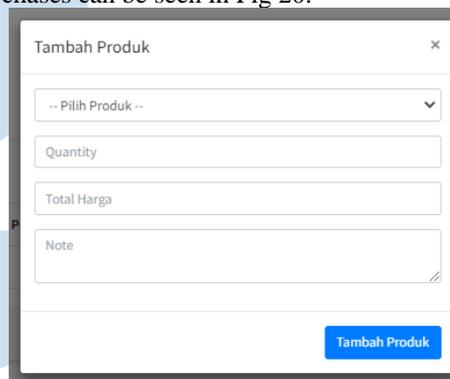
Fig 20. Add Product Data Page on Purchase

When successfully adding product data to a purchase it will appear in Fig 21.

Fig 21. Successful Add Product Page On Purchase

The sales data page is a page that displays information on sales data at PT Shafira Putri Kreatif which consists of transaction no, branch, customer, transaction date, total qty, total price, maker and status. On the sales data page, the branch admin can manage data, namely adding sales data

and viewing detailed sales data. Implementation of sales data pages can be seen in Fig 22.

Fig 22. Sales Data Page

Add sales data is a page used by the branch admin to add sales data by pressing the "Add Sales" button. Then the system displays an added sales pop-up which can be seen in Fig 23.
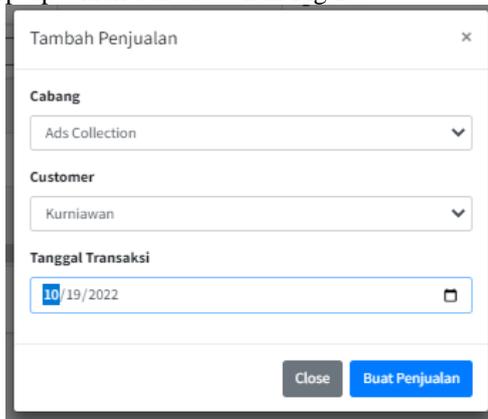
Fig 23. Add Sales Data Page

The successful page for adding sales can be seen in Fig 24. On this page you can add products, set status and print sales data.
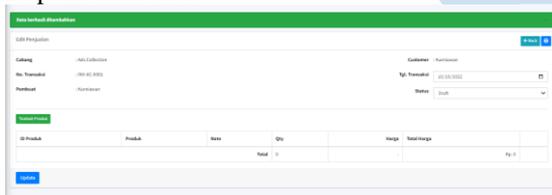
Fig 24. Successful Add Sales Data Page

When the product data has been added, it will be displayed on the sales data product list which can be seen in Fig 25.
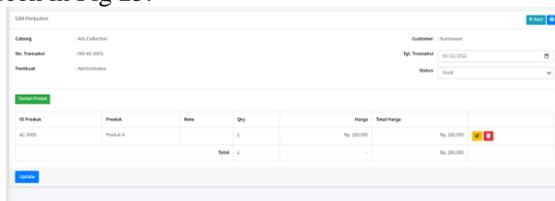
Fig 25. Sales Data Detail Page

On the sales data detail page, the branch admin can print sales transactions by pressing the "Print" button and displaying the printed page as shown in Fig 26.
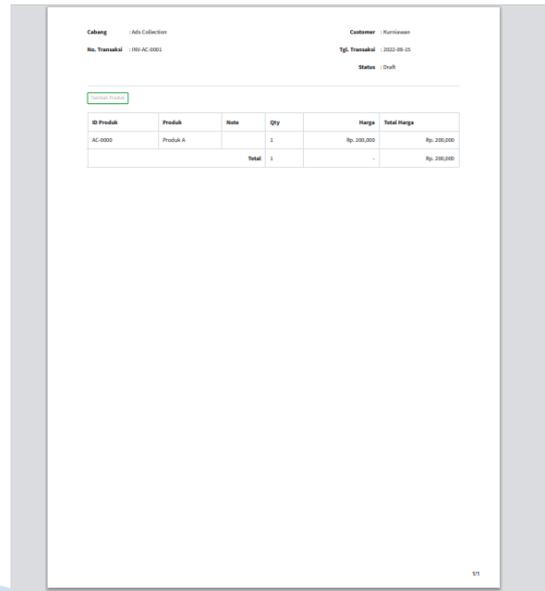
Fig 26. Sales Data Print Page

D. System Testing

System testing is carried out using the black box method which tests the functionality of the system that has been made. From the results of the tests that have been carried out, the results show that all functions can run properly.

Subsequent tests were carried out on application users, namely testing the user acceptance test (UAT) by making a questionnaire related to this application. Respondents used amounted to 9 people.

Calculation of UAT on the results of the questionnaire is carried out as follows:

1. Calculate the answer score

Calculation of the total score of the respondent's answers was carried out on all the answers chosen by the respondent and then added up.

The results of calculating the total score are as follows:

SS = 19 X 5 = 95
S = 46 X 4 = 184
N = 8 X 3 = 24
TS = 7 X 2 = 14
STS = 10 X 1 = 10
Total = 327

2. Calculating the highest score (X)

To calculate the highest score is done as follows.

$$X = Highest\ score \times$$
$$(number\ of\ questions \times$$
$$number\ of\ respondents)$$
(1)

= 5 x (10 x 9)
= 450

3. Calculate the lowest score (Y)
To calculate the lowest score is done as follows

$Y = Lowest\ score \times$
$(jnumber\ of\ questions \times$
$number\ of\ respondents)$
(2)
$= 1 \times (10 \times 9)$
$= 90$

4. Calculation of the percentage of UAT
After obtaining the number of respondents' scores, the UAT percentage calculation is carried out using the following.

$$P = \frac{f}{n} \times 100\ \%$$ (3)

Information:
P = Percentage
F = Response Frequency
n = Number of Respondents

$P = \frac{327}{450} \times 100\ \%$
$P = 72.6\ \%$

From the results obtained it was concluded that the total score obtained was 90 (72.6%) of the highest score of 450 (100%). This shows that the implementation of an integrated sales module system at PT Shafira Putri Kreatif is included in the Feasible category because it is in the range of 60 – 80%.

IV. CONCLUSION

From the results of the research on the integrated system design of the sales module at PT Shafira Putri Kreatif using the RAD method, it can be concluded that:

1. The system can record and store reports on goods, sales, suppliers and customers at PT Shafira Putri Kreatif, namely with an admin actor who can control data with the feature of managing data on suppliers, customers, branches, units, categories, products and invoices from 3 subsidiary companies PT Shafira Putri Kreatif.

2. How the system works in connecting entry, exit, and the state of stock of goods in each subsidiary, that is, in the system there is a branch admin actor who can manage product data, sales and purchases which can be displayed on the admin dashboard.

3. Prioritized ERP implementation in this study, namely production and sales at PT Shafira Putri Kreatif in the form of a website that can establish communication between subsidiaries at PT Shafira Putri Kreatif. The results of system testing using the blackbox method show that all features

can be carried out according to their expected functions with minimal errors/bugs and a fairly effective and easy-to-use appearance for novice users. Furthermore, a user acceptance test (UAT) test was carried out which obtained a percentage of 72.6% which was included in the "Decent" feasibility category.

Based on the above conclusions, suggestions are made for further research, namely:

1. For further research, it is hoped that it will be able to deepen the application of Enterprise Resource Planning (ERP) in business processes carried out in a company such as considering the production raw materials used, the production processes undertaken.

2. For further system development, it is necessary to evaluate existing/implemented ERP modules, then carry out an analysis to find out the needs of further users.

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