Optimization Of *Transaction Processing System* (TPS) Using RAD With Fast Method

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Abstract.
The use of computer-based information systems today has been understood by most companies in order to survive and succeed well. The transaction processing system (TPS) is a computerized system that runs and records daily routine business transactions that serve the operational level in the company. Information systems of purchase, inventory, sales are part of the TPS widely used by companies. The problem here is how to ensure that the system is connected to the organization's business plan and information requirements, where often a system that is built is not in accordance with the wishes of the user. Meanwhile, manual information systems can cause problems such as data redundancy, inconsistent data, irregular recording, miscalculations, difficulty in finding data and delays in presenting reports. To build the information system, the Framework for the Application of System Thinking (FAST) method will be used with a Rapid Application Development (RAD) approach that uses selected prototype features. The solution is expected to build an information system that can bring together user requirements and help companies process purchase, inventory and sales data in an integrated manner, so as to increase the efficiency and effectiveness of retail data processing.

Keywords: *Sistem information, information, transaction processing system, and FAST, RAD.*

I. INTRODUCTION

Computers are an essential part of modern information systems, and it is virtually impossible to study information system today without knowing some thing about them and how they operate [1]. Today many companies have switched from the use of manual systems to computerized systems to carry out business processes, towards success rates, efficiency, competitiveness and profitability [2]. Information systems can help companies expand their reach to remote locations, acquire new forms and workflows, and possibly change the way they do business. At TPS the information system that is often used by most companies for their business processes includes sales, and purchases, inventory, and sales. Therefore, an information system is needed that is able to overcome problems such as data redundancy, inconsistent data, irregular recording and miscalculations, difficulty in finding data and delays in presenting reports so that the purchase, inventory and sales information produced can be accurate and timely. And sistem built can bring together user requirements.

II. METHODS

Information System

In [3] An information system can technically be defined as a unit of interconnected components that collect (or regain), process, store, and distribute information to support decision-making and control within an organization. Also, as a supporter of decision making, coordination, and control, information systems can also help managers and employees to research problems, visualize complex points, and create new products.There are three activities in an information system, namely input, processing, and output (see figure 1). Inputs capture or collect raw data from within the organization or from the external environment. Processing transfers the lines of input into a more meaningful format [4]. The output transfers the processed information to the people who will use it or to the activities that need it. The information system also requires feedback, that is, the output is returned to the members of the organization in question to evaluate or correct the input stage. The following will outline how to build a company information system that is restricted to sales and purchases, which involves inventory.

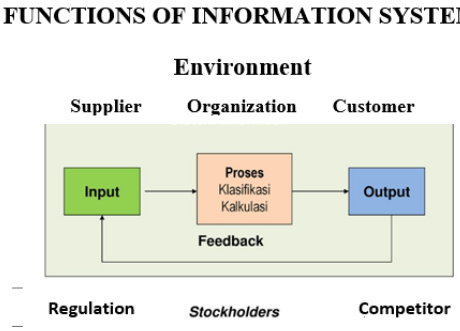


Fig 1. Scope of functions of information systems peraturan

Purchasing System

According to [5] purchasing is the process of procurement of goods by the company with the aim of selling the goods. According to [6] a special purchasing activity within a trading company is the purchase of merchandise. Some of the related functions in purchasing activities include:

1. Warehouse function, responsible for submitting purchase requests according to the position of inventory in the warehouse and storing goods received by the receiving function.
2. The purchasing function, responsible for obtaining information regarding the price of goods, determining the selected supplier in the procurement of goods and issuing a purchase order to the selected supplier
3. The revenue function, is responsible for checking the type, quality, and quantity of goods from suppliers to determine whether the goods can be received by the company. The receiving function is also responsible for receiving goods from buyers derived from sales return transactions.

Sales System

According to [5] sales is an effort to develop strategic plans directed at satisfying the needs and desires of buyers, in order to obtain sales that generate profits. Some related functions in sales activities include:

1. Sales function, responsible for issuing sales orders and ordering to the warehouse function to issue goods.
2. Warehouse function, responsible for issuing goods in accordance with those contained in the purchase order. The warehouse function is also responsible for receiving goods from the purchase return.
3. Delivery function, responsible for sending goods that have been issued by the warehouse function and obtaining signatures from the customer for the goods that have been received on the letter of receipt of goods.
4. Billing function, responsible for issuing invoices after receiving a letter of receipt of goods that have been signed by the customer and billing the customer.

Sales return transactions occur if the company receives a return of goods from the customer.

Inventory System

Activities that take place on the inventory system are included in the buying and selling system [7]. The method used for the inventory system is used the Just In Time (JIT) inventory control system method. Just In Time (JIT) is a production and inventory monitoring system in which materials are purchased and units are produced only to meet actual customer demands. In a just-in-time system, inventory is reduced to a minimum and sometimes zero. The JIT approach can be used in both manufacturing companies and trading companies. The main advantages that can be obtained from the JIT system include:

1. The cost for inventory can be used for other business purposes.
2. Previous areas used to store inventory can be used for other productive uses.
3. Reduced product defect rates add to customer satisfaction.

However, the JIT system also carries risks to the company, especially those related to the supply chain which results in stock terminations.

Rapid Application Prototyping (RAD)

According to [8] Rapid Application Development (RAD) is a method of system development that emphasizes the speed of development through extensive user involvement in fast, repetitive, and incremental construction, a series of prototypes work a system that ultimately evolves into the final system. The basic principle behind prototyping is that the users know what they want when they see it working. In RAD, a prototype eventually evolved into a final information system. The RAD route for FAST can be seen in figure 2. The finished product is in the form of, the purpose of the initial system repair, the statement of the initial business requirements, the initial system proposal, and the initial application architecture. The finished product is said to be the initial product because it is expected to change again while the project is carried out. The purpose of system repair is a measure of the success of the new system from the improvements made. Application architecture is a technological specification used to implement information systems. The application architecture serves as an outline for detailed design, construction, and implementation. After the initial analysis, the RAD approach repeats through a cycle of phases described as "do design, construction, analysis, design again, analysis again", and so on, until a final version of the system is ready for implementation.

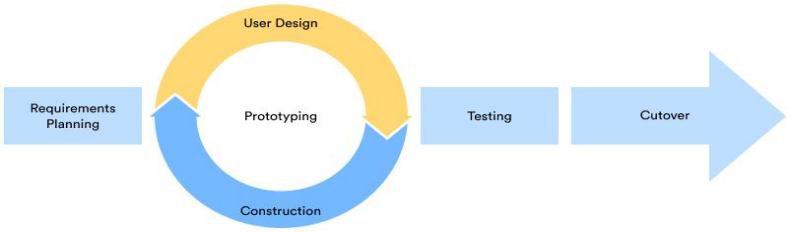


Fig 2. Rute RAD pada FAST

Framework for the Application of System Thinking (FAST)

The FAST methodology does not impose a single approach that integrates all popular approaches. The FAST method consists of the following stages:

Analysis,

The analysis phase consists of the analysis of the initial problem, the analysis of requirements, and the analysis of decisions. This stage is accelerated.

Design,

Physical and logical design specifications are usually significantly shortened and accelerated.

Construction and testing,

Some elements of a design prototype or functional system are partially constructed and tested.

Review the system,

Users of the system are given the opportunity to "experience" working with the prototype. The hope is that users will clarify the requirements, identify the new requirements, and provide business feedback on the design for subsequent repetitions in the RAD cycle. Analysts and system designers will revisit the architecture and design of the application to provide technical feedback and briefing for subsequent repetitions in the RAD cycle.

Delivery,

The system is considered valuable to implement. The release version of this functional system candidate is a system that is tested and placed in operation

Prototype

A prototype is a small-scale, representative, or working model of the user requirements or proposed design for an information system. Any prototype may eliminate certain functions or features until such time as the prototype sufficiently evolves into an acceptable implementation of requirements. Some types of prototypes include:

1. Patched-up prototypes, this first type of prototyping is related to the preparation of a system that works but patches or patches together. An example in an information system is a working model that has all the necessary features but is inefficient.

2. Non-operational prototype, the conception of the second prototype is a prototype of an idle scale model compiled to test certain designs.
3. First-of-series prototype, the conception of the third prototype involves the creation of the first complete-scale model of the system.
4. Prototype selected features, the conception of the fourth prototype relates to the construction of an operational model that includes some, but not all the features that the final system has.

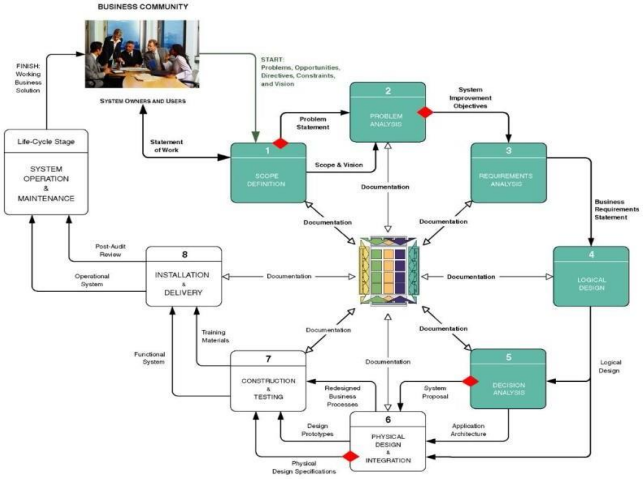


Fig 3. Stages of FAST Analysis

III. SYSTEM DESIGN

System Optimization Goals

Here a company is chosen to build an information system. System users are *purchasing, selling* and *inventory staff* [9]. The targets of improving the purchase and sales information system developed include:

1. Increase employee productivity
2. Streamline the buying and selling process
3. Improve the effectiveness of decision making by system users and management

Requirements Statement

In table 1 the following is a list of functional requirements that must be met by the purchase and sale information system, and the inventory built. The needs of the non-functional system are that the purchasing sub-system can only be accessed by the purchase function, the sales sub-system can only be accessed by the sales function, the inventory sub-system can only be accessed by the inventory function.

Table 1. Functional Requirements

User	Desk	Requirements
Purchasing	**Function**	1. The system can store, edit, and delete *supplier* data and purchase data. 2. Integrated purchase data from the purchase *order* data to the receipt of invoices. 3. Purchase data is re-accessible and easy to search. 4. The system can generate purchase reports
Sales	**Function**	1. Customer *data* can be categorized according to project and non-project *customers.* 2. The system can store, edit, and delete *customer* data and sales data. 3. Integrated sales data from the existence of *sales orders* to the creation of *invoices*. 4. Sales data is re-accessible and easy to search. 5. The system can generate sales reports.
Inventory	**Function**	1. The system can save, edit, and delete product data. 2. Product data is re-accessible and easy to search. 3. The inventory amount can be updated based on data on the receipt and expenditure of goods made by the purchasing function and the sales function. 4. The system can generate reports Inventors.

Initial Application Architecture

The initial application architecture for the purchasing, selling and inventory system is carried out by analyzing the information collected by drawing a physical DFD, in the form of a context diagram, diagram 0 consists of five processes, namely data input, purchase, sales, up-date stock, and report generation [10]. On the detailed diagram developed processes 1,2, and 3. Then proceed with a data dictionary analysis that produces 19 tables. Next is the system design, namely the database design consisting of 19 tables

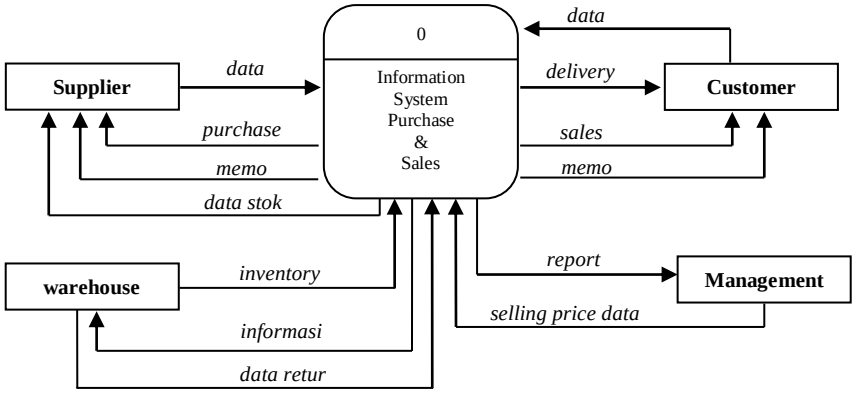


Fig 4. System context diagram

The output design is in the form of purchase order documents addressed to suppliers, delivery order documents and sales invoices addressed to customers, debit memos addressed to suppliers, and credit memos addressed to the warehouse as orders for receiving goods from customers. The input design consists of the design of login input forms, customers, suppliers, products, purchase requisitions, purchase orders, receipt of goods and invoices, debit memos, sales orders, delivery orders, sales invoices, credit memos, stock updates, sales reports, purchase reports, and inventory reports. The graphical user interface (GUI) design consists of three main menus, including customers and sales, suppliers and purchases, and inventory as shown in figure 4.

Construction and Testing

There are four prototypes made to build this system. In each prototype, the user will provide feedback then the development team reviews, re-analyzes, and re-designs of the system and is built. The re-design of this prototype is carried out on the design of the output, input, database, and user interface [11]. The login form as shown in figure 5 is the initial display that can only be used by the purchasing, sales, and inventory departments. There is a submenu display, namely for purchases, sales, and inventory as shown in figure 6.

Fig 5. Login page

Fig 6. Form untuk *purchase, sales* dan *inventory*

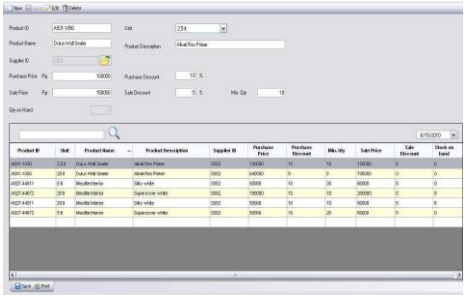
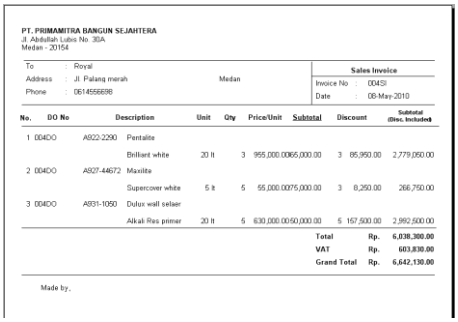


Fig 7. *Form input customer* dan *supplier*

The input display consists of customer, supplier, product input forms as shown in figure 7. Purchase requisition, purchase order, receive, purchase return, sales order, delivery order, sales invoices, sales return, stock update, view spoiled stock, Input sales report, input purchases report, and input inventory report. The documents and reports produced are Purchase Order, Delivery Order, Sales Invoices as shown in figure 9, Debit Memo, Credit Memo, Monthly Purchases Report, Purchases Report per Product, Monthly Sales Report as shown in figure 10, Sales Report per Customer, Sales Report per Product, Monthly Inventory Report, Detail Inventory Report, Products Report, and Spoiled Inventory Report.



PT. PRIMAMITRA BANGUN SEJAHTERA
Jl. Abdullah Lubis No. 30A
Medan - 20154

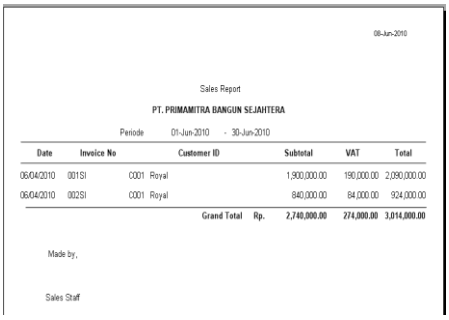
To : Royal
Address : Jl. Palang merah Medan
Phone : 0614556698

Sales Invoice
Invoice No : 0045
Date : 08-May-2010

No.	DO No	Description	Unit	Qty	Price/Unit	Subtotal	Discount	Subtotal (Disc. Included)
1	004DO	A922-2290 Pentalite						
		Brilliant white	20 lt	3	955,000.00	865,000.00	3 865,950.00	2,779,050.00
2	004DO	A927-44672 Maxilite						
		Supercover white	5 lt	5	55,000.00	275,000.00	3 8,250.00	266,750.00
3	004DO	A931-1050 Dulux wall seler						
		Alkali Res primer	20 lt	5	630,000.00	50,000.00	5 167,500.00	2,992,500.00
						Total	Rp.	6,038,300.00
						VAT	Rp.	603,830.00
						Grand Total	Rp.	6,642,130.00

Made by,

Fig 9. Sales invoice



08-Jun-2010

Sales Report

PT. PRIMAMITRA BANGUN SEJAHTERA

Periode 01-Jun-2010 - 30-Jun-2010

Date	Invoice No	Customer ID		Subtotal	VAT	Total
06/04/2010	001SI	C001	Royal	1,900,000.00	190,000.00	2,090,000.00
06/04/2010	002SI	C001	Royal	840,000.00	84,000.00	924,000.00
			Grand Total Rp.	2,740,000.00	274,000.00	3,014,000.00

Made by,

Sales Staff

Fig 10. Monthly sales report

To overcome customer complaints, companies must explain negative consumer feedback into positive [12], with this buying and selling information system helping users with the following advantages [8][13]:

1. The system prevents the same document numbering loop by displaying data from pre-existing document numbers.
2. With the status and residual data of a transaction processing, users can see and quickly check the processing of a transaction and the rest of the orders that have not been received or have not been sent.
3. Users only need to input the date, document number, type of goods or customer or supplier code when looking for certain data. Manually searching and grouping data takes a long time.
4. Making sales invoices is easier because the data is directly taken from the delivery order data and the sales calculation data is also in accordance with the previous sales order data, thus preventing the occurrence of errors in making and calculating sales invoices, as well as making data on receipt of goods and purchase invoices. In addition, data on the expenditure of goods can also be done immediately without having to wait for the inventory staff to update the amount of stock of the goods concerned.
5. A delivery order can contain several sales orders and a sales invoice can contain several delivery orders with the provision of similarity of the intended customer that has been validated by the system.
6. Reports can be generated by simply inputting the period of the desired report and reports can also be made in detail according to the categories provided.

This purchasing, inventory and sales information system processes inventory data only to incoming and outgoing goods data derived from purchases, sales, purchase returns, and sales returns [14][15]. while supervision of the quantity of stock that has reached the reorder point still has to be done manually. The development of this inventory sub-system can be done in the development of the next prototype.

IV. CONCLUSION

From the development of the system carried out, conclusions were obtained, namelywith the development of the buying and selling information system, the system improvement objectives set at the system analysis stage were achieved. The system increases employee productivity, minimizes administrative problems of purchases, sales and inventory with the efficiency and effectiveness achieved with the developed information system. The system helps users present accurate and timely information every period and according to management requests. The system is developed with an iterative prototype so that there is a possibility of further prototype development.

V. THANK YOU

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