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Original Article

Request Order System for Goods and Services Using PIECES Analysis

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Abstract *- The Procurement of goods and services is important in supporting the continuity of projects and companies. Through the process of procuring goods and services, the needs of project material and head office can be met. In general, the procurement process includes goods or services requests, Quotation Requests, Offers Evaluation, and Purchase Orders. In companies, the goods requests or order requests processes are often repeatedly done due to incomplete information. Besides, procurement requests are often accumulated based on the repeated confirmations of the requester and the budgeting staff. To find out the problems from the existing business process in detail, system analysis was performed using the PIECES method. This research purpose is to minimize the errors in the Order Request information recording process and to improve the Order Request monitoring process. The Order Request system for goods and services is a solution for those problems.*

Keywords *- PIECES, Request Order.*

I. INTRODUCTION

Technological developments affect many aspects, one of which is in the business sector. By utilizing existing technology, companies have a greater opportunity to develop and change their business processes. Most companies have moved their business processes from manual processes to computerized processes[1]. Companies can also develop business strategies so that they can build relationships and increase productivity in increasingly fierce competition [2], [3].

The Procurement of goods and services is one of the important processes in the company because, through this process, the company can meet operational needs and project needs and ensure the availability of materials or raw materials to support business processes. In a study conducted by Dimas Prasetyo, he stated that one of the important aspects of project planning is the project material procurement process[4]. The same thing was conveyed in Ai Rosita's research which stated that the availability of materials greatly determines the productivity of a company[5].

The procurement process is closely related to the progress of work, especially in a project. In general, the procurement process starts with a request for goods or services (request order), Request For Quotation, evaluation of offers, and purchase orders. However, often companies process product requests or order requests that are repeated due to incomplete information. In Ni Nyoman Utami's research, it is stated that conventional Procurement of demand goods has minimal accuracy and slow handling[6].

Through the process of requesting orders, companies can ensure the suitability of goods and the timeliness required for project work, which will also affect the results obtained. In Atikah's research, the procurement process has an important role because the quality of the products produced is highly dependent on raw materials, process speed, and good data collection[7]. In line with this, Ricky Effendi and their friend's research states that the information in the order must be correct because otherwise, it will create risks such as piling up goods. Too much supply is also a source of idle funds because the funds associated with it cannot be used for other purposes[8].

Besides, procurement requests often accumulate due to repeated confirmations to requesters and budgeting staff, leading to delays in project completion. As in Amar Natasuwarna's research, it was stated that the delay in the procurement process was the cause of the delay for workers in carrying out the work because the work could be done if the goods needed were available[9].

Responding to the above problems, it is necessary to create an order request system that can minimize errors in recording order request information and improve monitoring of the order request process.

With this order request system, it is expected to increase the effectiveness and efficiency of the company's procurement process. In his research, Ramdani stated that the demand data processing system became more effective, and data security became more secure [10]. The same thing was also conveyed in Wisnu Cahyadi's research which stated that using a computerized system could reduce frequent recording and calculation errors[11]. So that in the long term, the information system will provide benefits in improving performance and competition in an increasingly fierce market. From a sustainable perspective, information

systems can enable companies to make improvements, standardize, and maximize existing business potential [12].

The objectives to be achieved in this research are to improve the effectiveness of the process of submitting and approving order requests, increase the effectiveness of the procurement system, managing supplier data and goods or services data, and improving budget control for the procurement process.

II. RESEARCH METHODS

This research takes data sources using field research methods. The data is taken using observation techniques in the procurement process of goods and services, conducting interviews with one Procurement Staff (from a total of two Procurement staff), the Manager in the Procurement Division, and collecting data in the form of documentation: Company Profile, Request Order Form (RO), Work procedures for Procurement of goods and services, supplier data and service goods master data. The data collected were analyzed using qualitative methods, and the results of research reports were presented using descriptive methods.

The flow of research carried out can be seen in the following figure:

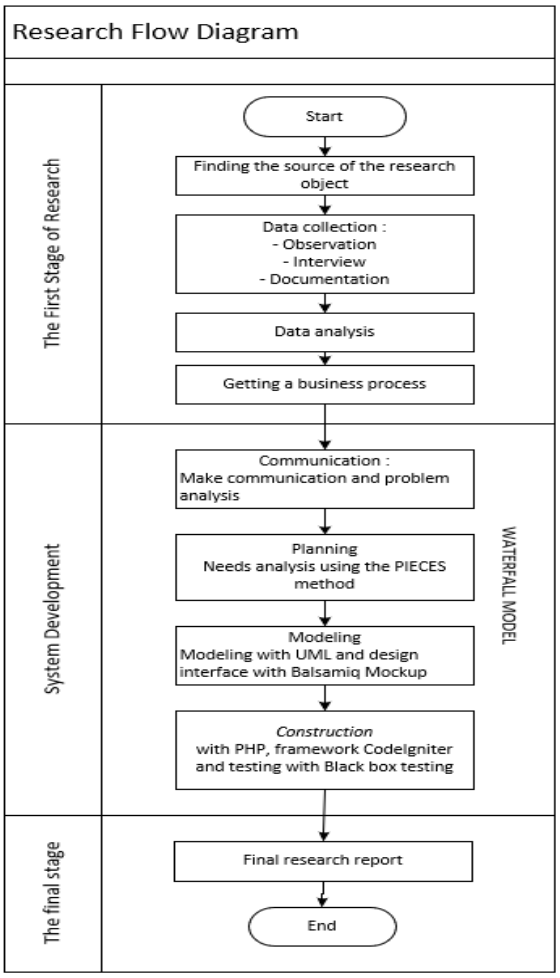

Fig. 1 Research flow diagram

The research flow diagram is as follows:

- Looking for objective sources to investigate the target to be achieved and its limits.
- Collect data and information to see the business process under study. Data collection can be done through observation, direct interviews, and based on documents.
- Conduct analysis based on the data that has been obtained.
- Getting a business process in the company.
- Stages of communication by communicating and analyzing problems that exist in the company.
- Planning stages or requirements design using the PIECES analysis method.
- Stages of a design system (Modeling) using UML and interface design with Balsamiq Mockup.
- Stages of construction by coding with PHP programming with CodeIgniter framework and MySQL database. Testing using Black Box Testing.
- Making research report results.

III. THE RESULT AND DISCUSSION

Based on data in the field, the order request system business process that has been running has involved several parties, starting from users in projects or at head office, managers, and the Procurement Division. This data helps in analyzing existing problems and helps in determining the best strategy for developing a new system. The running business process can be seen in the image below:

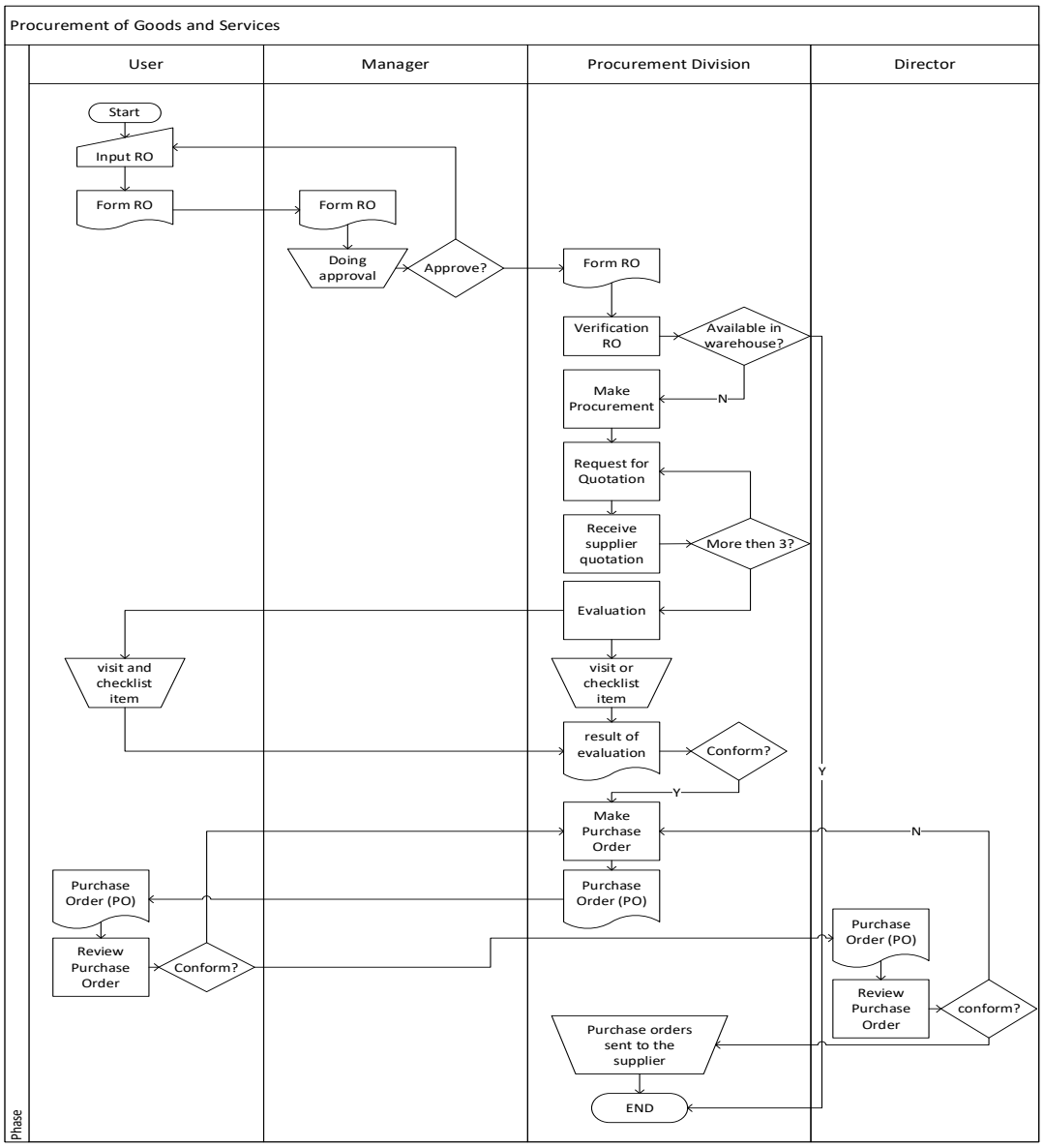

Fig. 2 Flowchart of Existing Business Process

The Procurement existing process of goods and services, as below:

- The User on Site Project or part that needs goods and services to request with input Form Request Order (RO).
- Then Manager or chairman to do approval Form RO.
- The procurement division verifies the RO created user-related goods/services required and the amount required before follow up.
- If the goods with the required amount are available in the warehouse, it will use the goods and not be carried out Procurement.
- If not available, the Procurement Division will carry out the Procurement by finding the price quote from the existing Supplier, with the provision of at least 3 (three) suppliers.
- Evaluate according to the incoming offers to know the appropriate Supplier, for the quality, price, term of payment (TOP), and the number of goods that can be denied.
- Checking the suitability of goods or services to be ordered is done by Procurement Division and User.
- When the goods/services are appropriate, the Procurement Division will issue a Purchase Order (PO) as the foundation to the Supplier who meets the criteria.
- PO later in review by User, Deputy Director, and Director, then signed by the director. The approved PO is sent to the Supplier as proof of the procurement Agreement of goods/services made.

A. PIECES Analysis

Based on the business process, generated analysis of the system described using the PIECES method (Performance, Information, Economic, Control, Efficiency, Service) as follows:

Table 1. The Results of The Analysis PIECES for Problem Identifications

PIECES	Problem Identification
Performance	• The specification of goods is incomplete, so the Procurement division takes time to reconfirm. • The RO approval process is blocked for waiting for the document to be handled by the Manager/chairman
Information	• Procurement demand often accumulates in the Procurement division because budget allocation is not available. • There is no data on the goods, so the name of the goods changes and is not standard.
Economic	• Operational costs such as telecommunication and high office stationery
Control	• No data backup If any time is lost • Difficulty monitoring the procurement process.
Efficiency	• Creating reports takes a long time
Service	• There is no information system, so the stored data varies per User.

Table 2. The Results of The Analysis PIECES for System Requirements

PIECES	System Requirements
Performance	• Create forms that can be integrated with the master data of Service goods. • Make notification if there are RO that need approval
Information	• Create a system integrated with Staff Budgeting. • Make master data of goods equipped with images.
Economic	• Create an integrated system between Procurement, Engineer, and Staff Budgeting, so telecommunication costs can be cheap.
Control	• Create database and backup data. • Provide monitoring access to the requester regarding the procurement status.
Efficiency	• Create a menu of reports that can be exported to Excel.
Service	• The information system is created so that the data is integrated.

B. Use Case Diagram

Based on the results of this analysis, a system design is produced, which is described using a Use Case Diagram, as below:

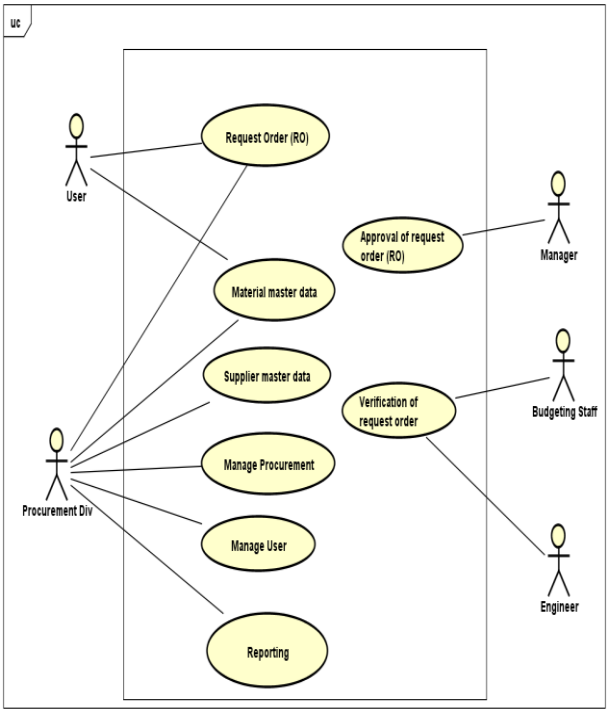

Fig. 3 Use case diagram

Use Case diagram in Request Order system. There are five actors, namely User, Manager, Procurement Division, Engineer, and Staff Budgeting. User is a part that requires service goods, and the User can be located at the head office or in the project. The User is responsible for managing request orders, such as creating, modifying, deleting, and sending request orders to the Manager to be approved. The Manager is a leader who has access rights to make approval or reject data that has been submitted by the User. The Engineer is the party that performs the technical verification process. The Engineer is tasked to do approval RO if the specification that is in RO is appropriate and reject if it is not suitable. Staff Budgeting is the part that verifies to ensure the budget for the Procurement is still adequate and usable. The Procurement division is the part that conducts the Procurement of goods, manages the supplier data, manages the master data of service goods,

manages the user data, and manages the procurement reports.

C. Design Business Process

From the results of the design that has been done, the business process is generated as below:

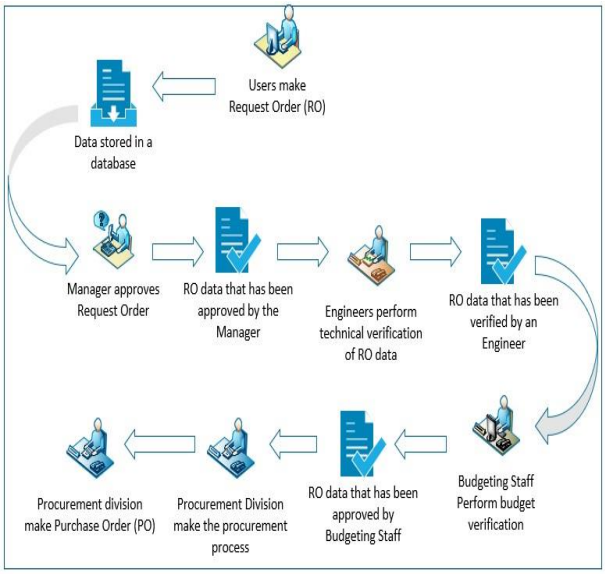

Fig. 4 Design business process

The proposed business processes are as follows:

- The user login to the Order Request System then inputs a request for goods/services. If the order request data is complete, the data is stored and submitted to the Manager.
- The Manager then approves the order request data. If the data is correct, then the Manager will click "Approve" if there is an error or data needs to be added, then click "Reject", and the order request data returns to the requester as a draft.
- The Engineer performs the technical verification of the request order data.
- Then the staff budgeting will verify the budget allocation for the order request.
- Furthermore, the order request data will be managed into Procurement by the Procurement Division. At this stage, the Procurement Division manages the Procurement starting from the initialization stage, request for quotations from suppliers, evaluating and assigning suppliers as providers of goods/services.
- If the procurement process is complete, the Procurement Division will create a Purchase Order (PO) as proof of purchase of goods/services.

D. Class Diagram

Based on the business process and design, a class diagram is produced to describe the system structure of the class and design, as below:

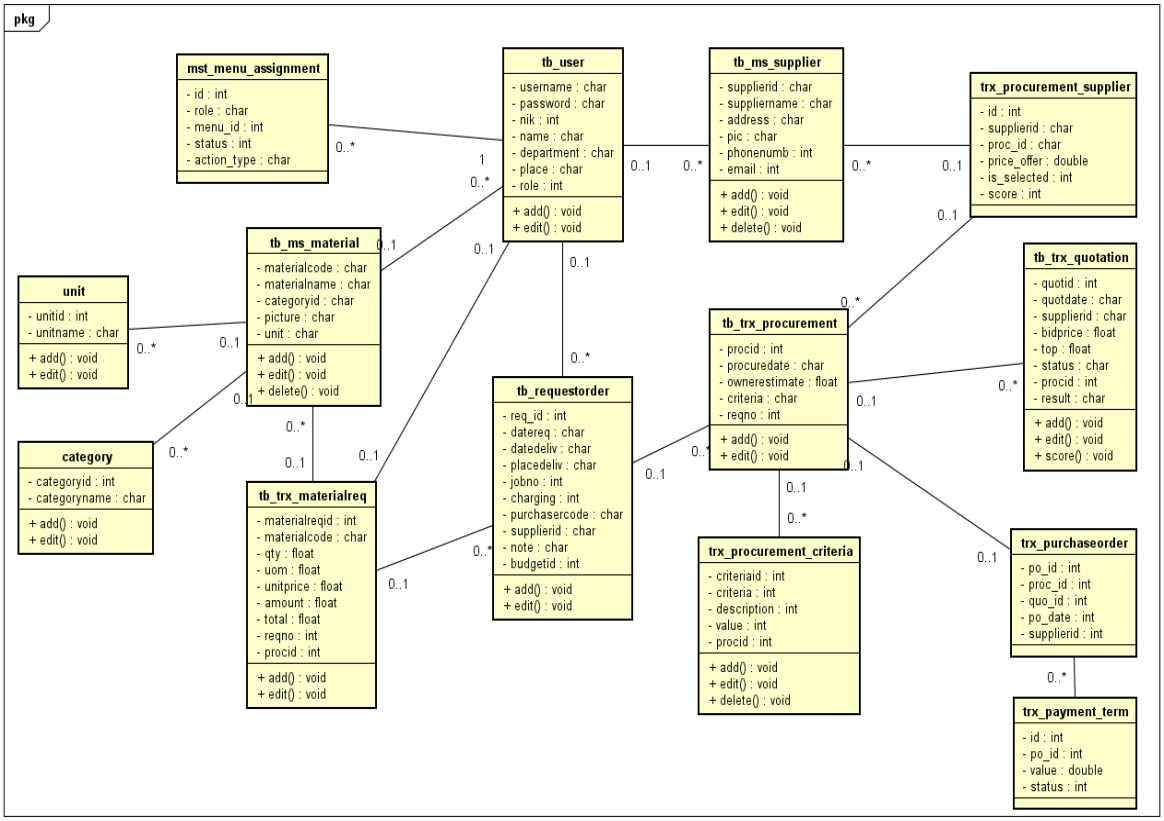

Fig. 5 Class diagram

From fourteen tables as in the above image, seven master data tables are consisting of "tb_ms_material", "category", "unit", "tb_user", "mst_menu_assignment", "tb_supplier", and "trx_procurement_criteria". The existence of master data can avoid mistakes when creating request orders. The fourteen tables related, for example, "tb_requestorder" and "trx_materialreq" correlated with this "tb_ms_material" shows when requesting the order of retrieving the goods/services from the master material. The "trx_quotation" table, "trx_purchaseorder" table, "tb_requestorder" table correlated with "trx_procurement" table for the procurement process. Table "trx_procurement_criteria" correlated with tables "trx_procurement" related to the criteria specified for a procurement. Table "tb_user" correlated with this "mst_menu_assignment" table to separate the menus of each User based on the role. The "tb_user" table correlated with the "trx_materialreq" table to show the User who performs any requests and goods/services the amount and price of the unit in the request.

E. Interface Design

Fig. 6 Page login

Fig. 6 image describes the User before doing activity in this system and has to login first by filling in the correct username and password and have registered. Suppose the process login is successful. After that, the system will display the home page. If it fails, the system will still display the login page. In this system is given access rights to the User, Manager, Engineer, Staff Budgeting and Procurement division according to the role of each.

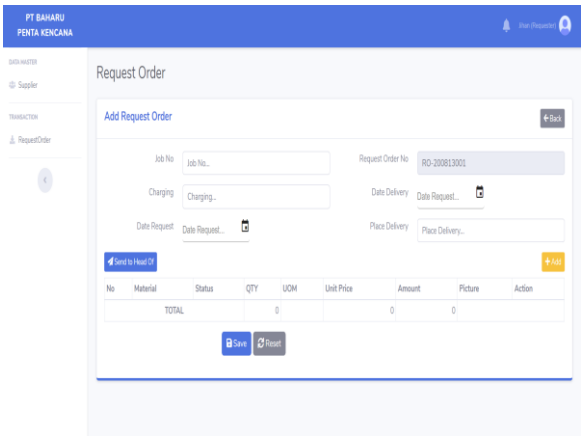

Fig. 7 Page create request order

In the picture above, explain to the company when managing Request Order, User who has successfully logged in and then accessed the Request Order menu and pressed the ADD Request Order button. Fields that must be filled on this page are Job No, Charging, Date Request, Date Delivery, Place Delivery, for RO No automatically filled in, adding material data, by pressing the ADD button, then selecting or typing code or material name then automatically the system will display the material data according to input, then fill the Qty, choose UOM, Unit Price and make sure the picture of goods or services If the RO stuffing is complete then User can press Save button to save RO data as draft, or press Send to Head of the button to send RO data to Manager as boss. This Menu helps users to make requests for goods or services with complete and specific information accompanied by images of goods needed to avoid mistakes during the procurement process.

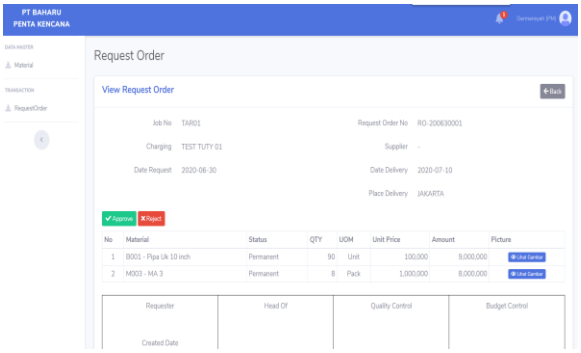

Fig. 8 Request order approval page

The picture above is explained to the Manager, who will make an approval RO. The Manager can see on the notification icon if there is a RO that should be at approving, then it will be directed to the details page RO. On this page, the Manager can see RO information such as Job No, Charging, Date Request, Date Delivery, Place Delivery, RO No, Material in Request. If the data in RO is complete and appropriate, then Manager can press the Approve button to continue the RO process to the Engineer and Staff Budgeting. If there is any error, then Manager can press the Reject button and enter the record to be returned to the User.

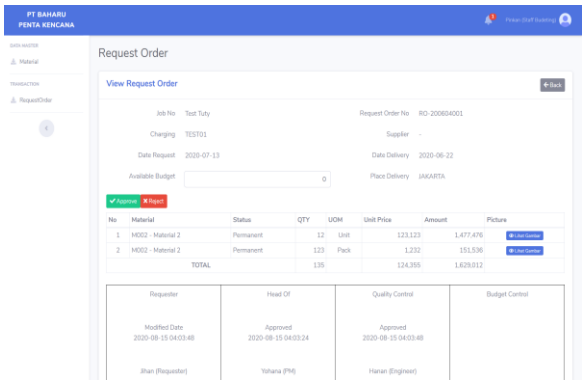

Fig. 9 Approval budget page

The picture above is explained for Staff Budgeting, who will do the budget verification of RO. Staff Budgeting can see in the notification icon if there is a RO that must be verified, then it will be directed to the detail page of RO. On this page, there are RO information such as Job No, Charging, Date Request, Date Delivery, Place Delivery, RO No. If the data in RO is complete and appropriate, then Staff Budgeting can press the Approve button to continue the RO process to Procurement. If there is an error or there is no budget allocation for the request, then Staff Budgeting can press the Reject button and enter the record to be returned to the User.

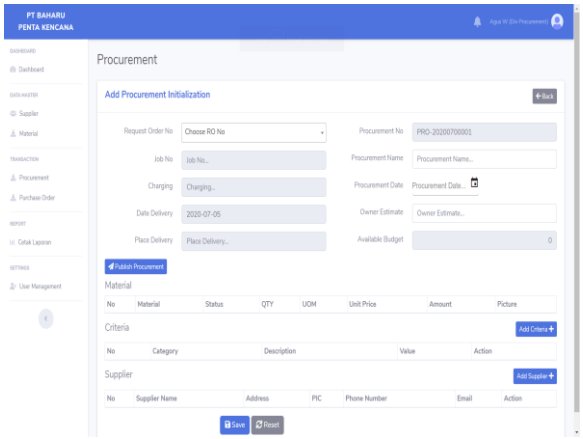

Fig. 10 Procurement initialization page

In the picture explained to manage the procurement process, the Procurement Division opens the Procurement menu. On that page, there is a procurement list according to the current stage. To make a new procurement, the Procurement division pressed the "ADD Procurement Initialization" button. On the page, the Procurement division must select No RO, then the data of Job No, Charging, Date Request, Date Delivery, Place Delivery will be filled automatically according to the data in the No RO. Then the fields that need to be filled next are Procurement No, Procurement Name, Date, Owner Estimate (OE), Criteria and Supplier that will be invited to the Procurement. At the time of "Add Supplier", simply input the Supplier name and then it will be filtered automatically. It aims to reduce errors that can occur. If the data was filled, then you can press the "Save" button to save the procurement data as a draft, or you can press the "Publish Procurement" button to process the further Procurement while sending the email automatically to the suppliers that have been selected beforehand. Procurement Division then evaluates based on the Quotation obtained from the Supplier and sets the Supplier that meets the criteria and has the best price.

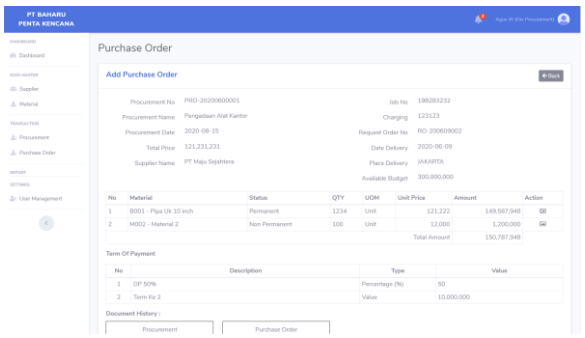

Fig. 11 Purchase order page

The picture above explains when the company manages the Purchase Order (PO) Procurement division can access the Purchase Order menu. Procurement Data that has been processed and has established a supplier as a provider of goods then can process a Purchase Order (PO) as a commitment between the parties in cooperation. On the page, Division Procurement can see the information of RO Job No, Charging, Date Request, Date Delivery, Place Delivery, Procurement No, Procurement Name, Date, Owner Estimate (OE), Supplier selected, and fill in the agreed term of payment (TOP). This Purchase Order (PO) will also be accepted by the Supplier as a cornerstone in the fulfilment of goods or services.

IV. CONCLUSION

The conclusions from this research:

- Request Order System can help User with the Request Order (RO) process, approval process by Manager, process verification by Engineer and Staff Budgeting
- Request Order System can help the Procurement division in the process of Procurement of service goods until the creation of a purchase order (PO).
- Request Order system can help the Procurement division to manage the data of the Supplier and master data of existing services, making it easier during the Request Order (RO) process.

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