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OPTIMIZATION OF THE SUPPLY AND DEMAND PROCESS WITH RUP METHOD IN CV PRATAMA TECH STUDI

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ABSTRACT
The level of efficiency and effectiveness of business processes is increasingly becoming the focus of every company, increasing competition and changes in the global market quickly, forcing companies to optimize their business productivity.The increasing number of domestic competitors requires companies to optimize their internal processes quickly so that companies can compete competitively. Difficulties that are often experienced by parts of the project in carrying out business processes, resulting in a misunderstanding between the marketing and the project itself, due to confusion of data to the information needed.Data that is managed is inaccuratecause's delays in the process of producing goods, and causes the process of shipping goods that become not timely. System design method to optimize the supply and demand process, designed using RUP (Rational Unified Process) consisting of use case diagrams, activity diagrams, and class diagrams. After implementing the supply and demand information system, it is expected to be able to overcome the problems that occur to optimize the supply and demand process in the company.

BACKGROUND

Optimization of business processes within a company must be done, given the rapidly increasing competition and changes in the global market forcing businesses that run the company to increase its work productivity. Rapid changes in markets, products and technology require management in the company to make decisions in a short time with minimal information and a high risk of failure.

CV. Pratama Tech Studio is one of the business people who offer their products by marketing and receiving requests for goods from government agencies and private companies to the delivery of products to the final consumer. Lack of application of information technology to support company business processes, resulting in difficulties to see the number of offers that enter the company, so there are often misunderstandings between the marketing and the project. In the production and warehouse departments, there is often an error in inputting data with the information needed, because there is no integrated system.In addition, the demand for goods also often experiences obstacles such as production of goods, delivery of goods that are not timely, errors in shipping and various other obstacles because inaccurate data is managed. The inaccuracy of the managed data is caused by the manual data collection process that still uses Excel and sends via the application a message or email.

Therefore, with the development of business from day to day and the increasing number of supply and demand that must be met, a supply and demand information system will be applied and expected to optimize the company's business processes in overcoming problems that occur in terms of supply and demand of goods in CV.Pratama Tech Studio. One alternative solution to overcome this problem is optimize the supply and demand process in the CV. Pratama Tech Studio using the RUP method, RUP is a system development framework with stages of diagnosing, action planning, action taking, evaluation and learning, by using the concept of UML (Unified Modeling Language) which consists of use case diagrams, activity diagrams, and class diagrams.

Formulation of the problem

The formulation of the problem obtained as follows:
1.   How to create an information system that can manage, maintain data, in terms of demand for goods so as to make valuable information?
2.   How to make an information system that becomes a means of exchanging information for business people in the company?
3.   How to make an information system that can present demand data and item planning?

Research purposes

Based on the above problem formulation, the objectives of this study are:

Make a clear business process flow so that the management of data and documents in the company does not occur in error, so that it will produce accurate information for business people.Optimizing existing business processes by implementing an integrated information system.

Identifying alternative strategies to optimize the supply and demand process specifically in the context of improving performance and accurate information exchange.

LITERATURE REVIEW

Theory of information systems

According to Hartono (2005) Information System is a system within an organization that meets the needs of daily transaction processing, support operation, managerial in an organization's strategic activities and provides reports required for outside parties. [1]

Meanwhile according to According Jogiyanto, H.M: 2003 information systems are a collection of subsystems, both physical and non-physical interconnected danbekerjasamasecaraharmonisuntukmencapaisuatutujuanyaitu and work together in harmony to achieve a goal that is processing data into useful information.

Information system components consist of :
Hardware
The collection of hardware involved makes it possible to form systems such as computers, printers and networks.

Software
Collection of commands or functions written with certain rules, instruct the computer to carry out certain functions.

Data
The basic ingredients of information.in the form of facts that raise real events and pour into a symbol.

Procedure
A stage in the form of interrelated sequence of activities to achieve the objectives in the form of a procedure document such as an operational and technical manual.

Human
Humans are executors of an information system such as Operators, Programmers, Analysts, Designers and so on. [2]

THEORY OF SUPPLY AND DEMAND

Theory of supply

According to (Rosyidi, 2005: 332) that supply is a list that shows the quantities of goods offered for sale at various price levels in a market that occur at a certain time. [3]

Ardiyati (2011) explains that bidding is the number of goods offered by sellers in a particular market, in certain periods, and at a certain price level. The law of supply basically states that: "The higher the price of an item, the more the number of items will be offered by the seller. Conversely, the lower the price of an item, the less the number of goods offered. " Ardiyati (2011) notes that price has a positive effect on the amount of goods offered, while the price of other goods will depend on the type of goods, whether substitution or complementary. [4]

Theory of demand

According to Sukirno (1994) demand for goods and services is the total amount of consumer demand for goods and services at a certain price and time period.

Demand theory explains the relationship between demand and price.In analyzing demand, it is necessary to distinguish the difference between demand and the quantity of goods requested. Demand describes the overall state of the relationship between price and quantity of demand. While the number of goods requested is the number of requests at a certain price level.This relationship between the quantity of demand and price gives rise to the law of demand. [5]

THEORY OF RUP (RATIONAL UNIFIED PROCESS)
RUP (Rational Unified Process) is an iterative software development approach, focused on architecture-centric, more directed based on use cases (use case driven). RUP is a well-defined software engineering process and well structured. [6]

RUP uses the concept of object oriented, with activities that focus on developing models using the Unified Model Language (UML). [7]
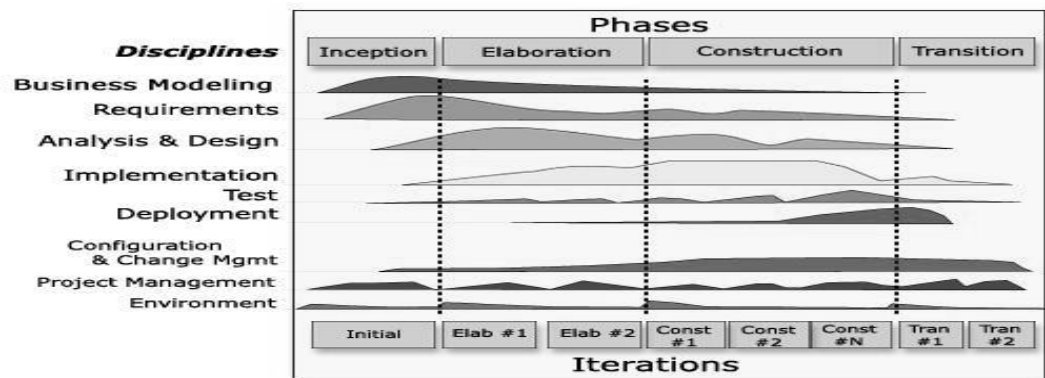
Figure1. RUP Architecture.

Through Figure 1 above, it can be seen that RUP has 2 dimensions, namely:

First dimension

Represented horizontally this dimension represents the dynamic aspects of software development. This aspect is elaborated in the development phase. Each phase will have a major milestone that marks the end of the beginning of the next phase. Each phase can consist of one or several iterations. This dimension consists of Inception, Elaboration, Construction, and Transition.

Inception
This stage further describes the business processes required and defines the system requirements to be made.
Elaboration
This stage is more focused on system architecture planning.
Construction
This stage focuses on developing system components and features and more on implementing and testing systems that focus on software implementation in program code.
Transition
This stage is more on the deployment or installation of the system so that it can be understood by the user.

Second dimension

Depicted vertically this dimension represents the static aspects of the software development process which are grouped into several disciplines. The software development process described in several disciplines consists of four important elements: who is doing, what, how and when. This dimension consists of Business Modeling, Requirement, Analysis and Design, Implementation, Test, Deployment, Configuration and Change Management, Project Management, Environment.

433

METHODE

The research method that will be used in the development of this information system, using the Rational Unified Process (RUP) approach is a repeated application development. Consists of four phases including: (1) Inception, (2) Elaboration, (3) Construction, (4) Transition. [8]

Inception

Determine the scope of the project; Make a "Business Case"; Answering the question "whether what is done can create a 'good business sense' so that the project can proceed".

Elaboration

Analyzing various requirements and risks; Establish 'baseline'; planning the next phase namely construction.

Construction

Do a series of iterations; each iteration will involve the following processes: design analysis, implementation and testing.

Transition

Make what has been modeled into a finished product; In this phase, it is carried out: Beta and performance testing, make additional documentation such as; training, user guides and sales kits, make product launch plans to the user community.

RESULTS AND DISCUSSION

Inception

At this stage the author will explain the needs of the system to be built. By analyzing the functional and non-functional requirements of the system, the writer then uses a use case modeling to define the system requirements to be built. Functional requirements of the system are as follows:

1.Marketing inputting the order data requested by the client, submitting offers and making requests for goods desired by the client.
2. The project checks order data, Approve PO Data, Inputs production cost data, makes bid prices, makes production request documents, checks delivery data, and returns damaged goods.

3. Production calculates the cost of production, preparation of production goods, makes data demand for materials, performs production of goods, and inputs data on goods produced.
4. The warehouse checks material demand data, makes request data to suppliers, makes material documents out and sends goods, checks incoming goods data, makes shipping documents, checks data returns, and makes delivery permits.
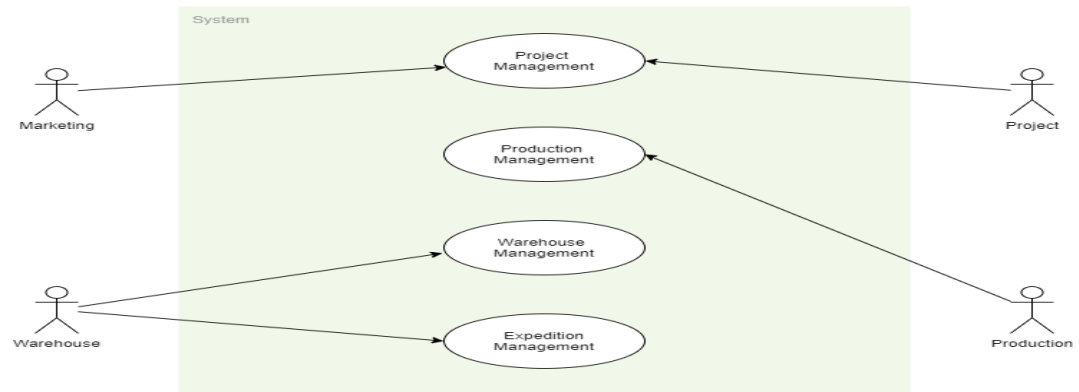
Use case modeling to define the system requirements to be built is as follows:

Figure3. Use Case Diagram of Supply and Demand Information System.

Based on an explanation of the previous functional requirements and illustrated in the use case diagram above, there are 4 main actors who play an important role in business processes, the explanation is as follows.
Marketing Actors in the system play a role in managing the use case project management. Enter the order data requested by the client, and submit an offer and make requests for goods desired by the client.

Project Actor, role is to manage project management use case. Checking order data, Acc Data PO, Production cost data input, make an offer price, making production request documents, checking data on shipping goods, and returning damaged goods.

Production Actor, role is to manage product management use case. Calculating the cost of production, preparation of production goods, making data on demand for materials or materials, producing goods, and input data on goods produced.
Warehouse Actor, role is to manage Warehouse Management use case and Expedition Management. Check material demand data, making data requests to suppliers, making material documents and sending goods, checking incoming goods data, make shipping documents, check data returns and make a letter of delivery of goods

Non Functional System Requirements, in contrast to functional requirements, non-functional requirements are carried out to determine hardware, software, and other support needed to support the running of the system. Which of course involves the user / users in the company?

Operational

Using a minimum Windows 7 operating system.
Minimum Core i5 computer specifications or use a laptop with the specifications above that have been mentioned
4Gb RAM requirements.
Printer.
Internet Network.

Security

The application system and database are equipped with a password.
Information
- Display information on the demand for goods from marketing.
- Display information on bid prices from the project section.
- Display information on production costs from the production department.
- Display material demand information in the warehouse section.

Elaboration

At this stage the authors do the design of procedural logic on the system, by describing the activity diagram and class diagram of the supply and demand information system that will be built as follows.

Activity diagram

Activity diagram focuses on the activities that occur related to a single process. So in other words, this diagram shows how these activities depend on each other. Activities that involve 4 main actors, namely Marketing, Project, Production and Warehouse who run the supply and demand process in accordance with their activities.
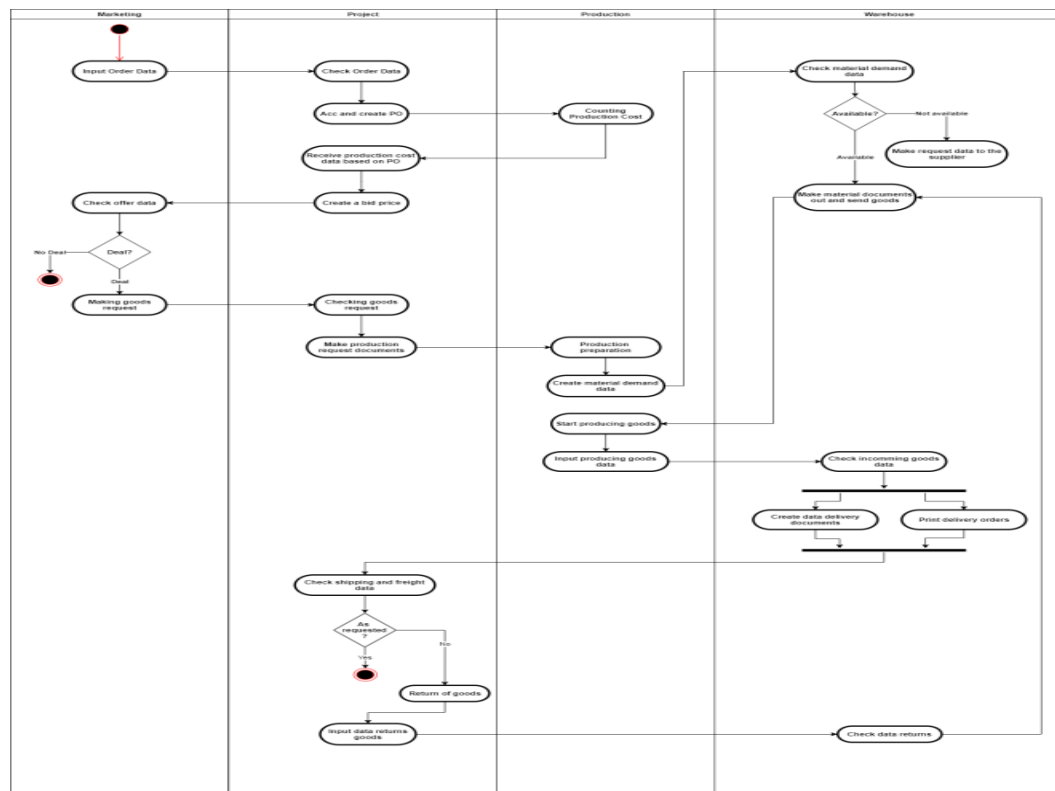
Figure 4. Activity Diagram of Supply and Demand Information System.

Class diagram

Class diagram is a description of the class structure of a system. With the class diagram it is expected to help the development of the system at the implementation stage. In Figure 5. class diagram, the attributes of each class and their functions are explained. Existing functions in each class have their respective tasks in accordance with system requirements.
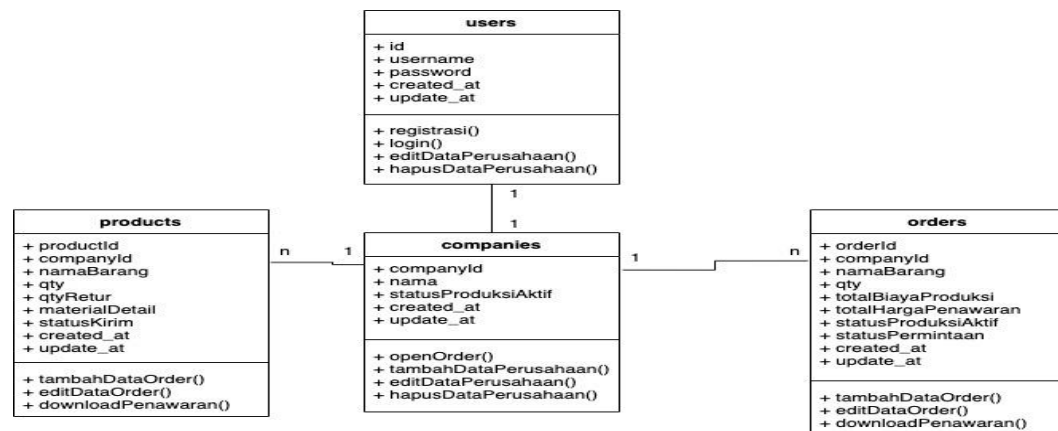
Figure 5. Class Diagram of Supply and Demand Information System.

```
update(req, res) {
const token = getToken(req.headers);
    if (token) {
Product.findById(req.params.id)
.then((product) => {
          if (!product) {
            return res.status(404).send({
              message: "Product Not Found",
            });
          }
          return product
.update({
companyId: req.body.companyId,
namaCompany: req.body.namaCompany,
namaBarang: req.body.namaBarang,
qty: req.body.qty,
qtyRetur: req.body.qtyRetur,
materialDetail: req.body.materialDetail,

statusKirim: req.body.statusKirim,

statusGudang: req.body.statusGudang,
            })
.then(() =>res.status(200).send(product))
.catch((error) =>
```

Construction

Implementation

The results of the design of supply and demand information systems using this RUP development method are web-based information systems that can optimize the supply and demand process in the CV. Pratama Tech Studio. Using the Java programming language.

Coding

This stage is the translation stage of the design of the language that is easily recognized by the computer. At this stage the javascript programming language is

used by using a visual studio editor, PostgreSql and Framework Express. The following is a piece of the source code for the CRUD function in the created information system.

Menu display

```
res.status(400).send(error));
        })
.catch((error) => {
res.status(400).send(error);
        });
    } else {
      return res.status(403).send({ success: false, msg:
"Unauthorized." });
    }
  },
```

Login page

On this page displays a login menu that will be used by users in carrying out activities in the company. Fill in the username and password for each form, and then click the sign in button.
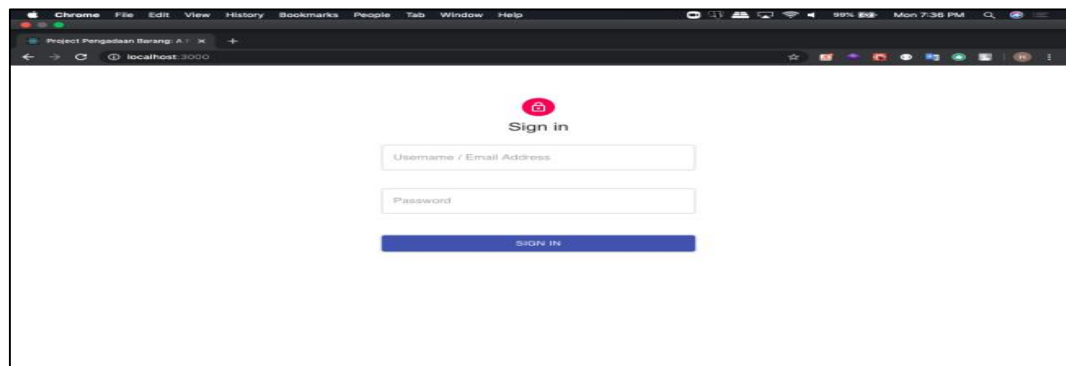
Display menu marketing

Company Order Page

In this menu view the user can fill in data about the company that will order the item. Then click the save button.

Add Form Order Page

On this page the marketing team fills in company order data in the form of item names, offer status, and the number of items ordered. Click the save button to save the data.

Manage Offers page

On this page is used by marketing to manage bidding, change bid status and be able to download offer letters for companies.
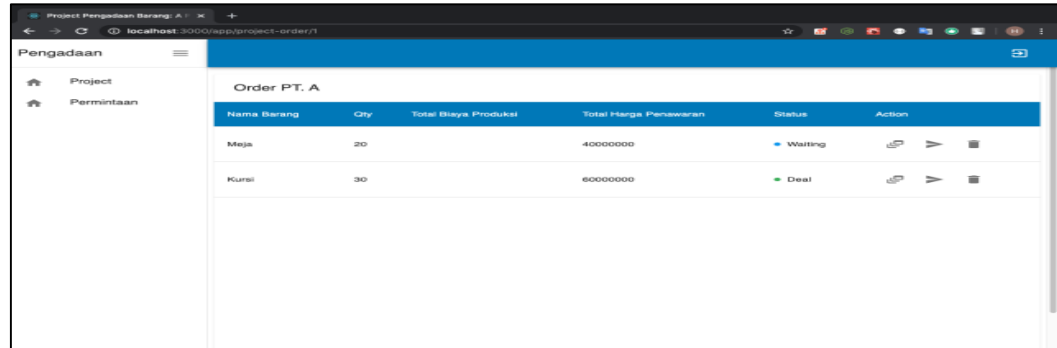
Project menu display

1. Project Manage page

On this page is used to view the status of marketing, update offer prices, and send requests to the production department.
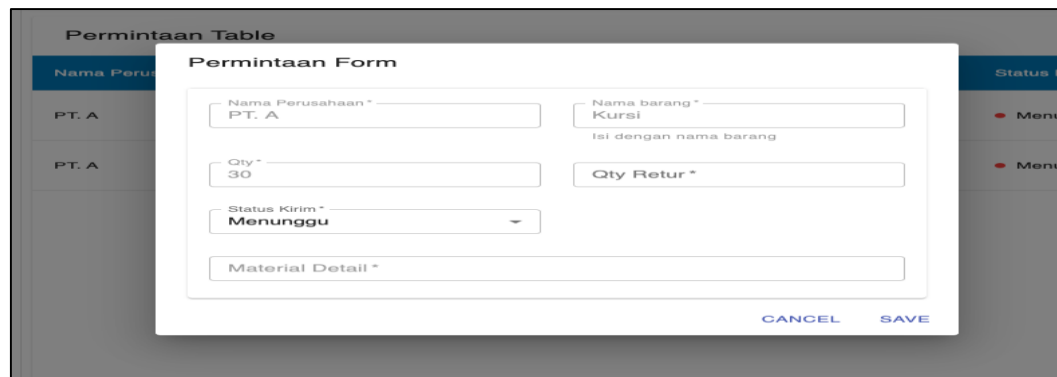

Return Form and Submit Status page

On this page is used by the project to input the returned goods data requested by the warehouse.

Production menu display

Goods Request page

On this page the production department can fill in the data request for materials to produce goods and explain the goods to be produced. After filling out the form, click the save button so that the data is saved.

Warehouse menu display

Warehouse Manage page
On this page the warehouse section can see the demand for material goods from production, update the status of the delivery of materials, as well as fill in the input form for loading goods.

CONCLUSION
1.   Create a supply and demand system to manage and maintain data on demand for goods so as to produce accurate information for business people.
2.   With the supply and demand system application, this can help the marketing team to submit requests for orders from clients that will be forwarded to the project team, so there will be no error in information.
3. Application of supply and demand systems can optimize performance in the company so that it can exchange information and be integrated with the company and clients.

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