INVENTORY OF GOODS DATA PROCESSING USING THE ECONOMIC ORDER QUANTITY (EOQ) METHOD

Hetty Meileni, Diky Juniansyah Putra, Desi Apriyanti, Indra Satriadi, Sony Oktapriandi

¹Jl. Srijaya Negara Bukit Besar Palembang Sumatera Selatan
²Jl. Srijaya Negara Bukit Besar Palembang Sumatera Selatan
³Jl. Srijaya Negara Bukit Besar Palembang Sumatera Selatan
⁴Jl. Srijaya Negara Bukit Besar Palembang Sumatera Selatan
⁵hmeileni@gmail.com
⁶dikyjuniansyahputra19@gmail.com
⁷aprilananda@yahoo.com
⁸aprilananda@yahoo.com
⁹sony.oktapriandi@gmail.com

Abstract Sriwijaya State Polytechnic (Polsri) which is one of the State Education Institutions in South Sumatra has Diploma III and Diploma IV programs. Currently, it has 23 Study Programs from 9 (nine) majors both in the engineering and non-engineering fields. The demand for tools and materials to support activities in each department, the Center and Technical Implementation Unit (UPT) is done manually, where the department administration department records the needs needed by the department known by the head of the department. Utilize the data processing system using the EOQ method facilitates the processing of inventory data. To overcome problems in the management of goods data in the warehouse such as running out of stock when a request appears from the Department, Central, and UPT. Data processing that has been computerized takes place so it can be stored properly and easily managed. The result of this research is web-based on an inventory of goods data processing using the economic order quantity method.

1. Introduction

Sriwijaya State Polytechnic (Polsri) is one of the State Education Institutions in South Sumatra that has Diploma III and Diploma IV programs. Sriwijaya State Polytechnic currently has 23 (twenty-three) Study Programs from 9 (nine) majors both in the engineering and non-engineering fields. The Departments and Study Programs for the engineering field are Civil Engineering Study Program, Mechanical Engineering Study Program, Electrical Engineering Study Program, Electrical Engineering Study Program for Telecommunication Engineering Study Program, Department Chemical Engineering Chemical Engineering Study Program, Computer Engineering Department Computer Engineering Study Program and Civil Engineering Affairs Road and Bridge Design Study Program, Chemical Engineering Department Energy Engineering Study Program. In addition, for non-engineering fields, the Accounting Department,
Accounting Study Program, Business Administration Department, Business Administration Study Program, Information Management Department, Information Management Study Program and English Department, English Study Program. Each Department and Study Program in Sriwijaya State Polytechnic both in the engineering and non-engineering fields requires some pieces of equipment to support the activities of each department.

Currently the demand for tools and materials to support activities in each department, the Center and Technical Implementation Unit (UPT) is still done manually where the department administration department records the needs needed by the department and known by with the head of the department. Some forms need to be filled out and signed by the head of the department then the head of the Center and the head of the UPT give it to the police inventory section for validation. The needs of the Department, Center, and UPT will be provided if the availability of the requested equipment and materials is available.

Inventory management is the process of efficiently overseeing the constant flow of units into and out of an existing stock of goods [1]. Inventory management is a vital function to help insure the success of manufacturing and distribution companies. The effectiveness of inventory management systems is directly measurable by how successful a company is in providing high levels of customer service, low inventory investment, maximum throughput and low costs [2]. Inventory management is a complex process, particularly for bigger organizations, but the basics are same indifferent of size or type of the organizations. In inventory management, products are delivered into the acquiring area of a warehouse in the form of raw materials or components and are put into stock areas. In comparison with the bigger organizations with more available physical space, in smaller companies, the products may go directly to the stock area instead of a receiving location, and in case of wholesale distributor, the products may be prepared products rather than raw materials or components. The products are then picked from the stock areas and carried to production facilities where these are made into finished products. The finished products may be restored to stock areas where these are held prior to shipment, or these may be exported directly to consumers. Inventory management uses a variety of data and keeps track of the products as these moves through the process, including lot numbers, serial numbers, cost of products, quantity of products and the dates when these move through the process [3].

Inventory management is an activity carried out by a company that is needed in making decisions so that the need for materials or goods for the needs of company activities can be optimally met with the smallest possible risk. Inventories that are too large (overstock) are a waste because it causes too high costs for storage and maintenance costs during storage in the warehouse. This research tries to build an inventory application by applying the EOQ (Economic Order Quantity) method as a basis for development.

With the website-based goods inventory data processing in the Polsri, it is easier to process inventory data in order to overcome problems that may occur in the management of goods data in warehouses, such as running out of stock when there is a request from the Department, Center, and UPT, and processing computerized data so that the process that takes place is not complicated and the existing data can be stored properly and easily managed.

2. Research Methods

The Economic Order Quantity and a Reorder Point (EOQ/ROP) model have been used for many years, but yet some companies have not taken advantage of it. An Economic order quantity could assist in deciding what would be the best optimal order quantity at the company’s lowest price. Similar to EOQ, the reorder point will advise when to place an order for specific products based on there historical demand. The reorder point also allows sufficient stock at hand to satisfy demand while the next order arrives due to the lead time. Since retail can be unpredictable and competitive, the interest of seeing how forecasting can affect the
economic order quantity (EOQ) and reorder point led to assist Company in finding alternative methods to solved their forecasting issues. [4]

The process of building computer software and information systems has been always dictated by different development methodologies. A software development methodology refers to the framework that is used to plan, manage, and control the process of developing an information system. The development of this research uses the waterfall model. The Waterfall SDLC model is a sequential software development process where the progress is regarded as flowing downwards which is similar to a waterfall in nature through a list of phases that must be executed step by step in order to successfully build a computer software. Originally, the Waterfall model was proposed by Winston W. Royce in 1970 to describe a possible software engineering practice [5]. Figure 1 below shows the process waterfall model.

![Figure 1. The Process of Waterfall Model](image)

Analysis Phase: Usually named as Software Requirements Specification (SRS) is a complete and comprehensive description of the behavior of the software to be developed. It implicates system and business analysts to define both functional and non-functional requirements. Usually, functional requirements are defined by means of use cases which describe the users’ interactions with the software. It includes such requirements as purpose, scope, perspective, functions, software attributes, user characteristics, functionalities specifications, interface requirements, and database requirements. In contrast, the non-functional requirements refer to the various criteria, constraints, limitations, and requirements imposed on the design and operation of the software rather than on particular behaviors. It includes such properties as reliability, scalability, testability, availability, maintainability, performance, and quality standards.

Design Phase: It is the process of planning and problem solving for a software solution. It implicates software developers and designers to define the plan for a solution which includes algorithm design, software architecture design, database conceptual schema and logical diagram design, concept design, graphical user interface design, and data structure definition.

Implementation Phase: It refers to the realization of business requirements and design specifications into a concrete executable program, database, website, or software component through programming and deployment. This phase is where the real code is written and compiled into an operational application, and where the database and text files are created. In other words, it is the process of converting the whole requirements and blueprints into a production environment.

Testing Phase: It is also known as verification and validation which is a process for checking that a software solution meets the original requirements and specifications and that it accomplishes its intended purpose. In fact, verification is the process of evaluating software to determine whether the products of a given
development phase satisfy the conditions imposed at the start of that phase; while, validation is the process of evaluating software during or at the end of the development process to determine whether it satisfies specified requirements.

Moreover, the testing phase is the outlet to perform debugging in which bugs and system glitches are found, corrected, and refined accordingly. Maintenance Phase: It is the process of modifying a software solution after delivery and deployment to refine output, correct errors, and improve performance and quality. Additional maintenance activities can be performed in this phase including adapting software to its environment, accommodating new user requirements, and increasing software reliability. [6]

3. Results and discussion
3.1 System Design
Data flow diagram of the inventory process can be seen in Figure 2 below

![Data Flow Diagram Processing Inventory](image)

Figure 2. Data Flow Diagram Processing Inventory

Explanation of Figure 2:
1. Admin department as users log in based on their respective username and password then fill in the item request form.
2. Admin to log into the application then can see data requests for goods that have been submitted by the user.
3. Admin can input goods data and inventory data.
4. Admin can validate the data request for goods that have been submitted by the user, whether the goods request is approved or not.

3.2 Application Display
3.2.1 Main page
This is the display of the login page on the start page. It consists of the institution administrator login page (Polsri) and the department administrator login page. The login page can be seen in Figure 3 below.
3.2.2 The Display of Department Admin Pages
On the admin page of each majors in Polsri, you can see the amount of stock and demand for stock. The admin page can be seen in Figure 4 below.
3.2.3 The Goods Demand Page

Figure 5 below shows the item request page sent by the admin department admin. Admin enter the request for goods to be submitted by the list that has been available in each department, the proposed request will be analyzed to obtain approval from the inventory.

Figure 5. Good requesting page

4. Conclusions

1. There are 2 users in processing of inventory data At Sriwijaya State Polytechnic software. Namely the department admin as the user and the inventory staff as admin.
2. There are goods data forms, goods inventory forms and user data forms in the admin page. On the user page there are item request form, inventory form, request list form and request detail form.
3. The results obtained from processing the inventory data is to provide convenience to the inventory and department admins in the Sriwijaya State Polytechnic in managing the demand and supply of goods.

References

[1] Abisoye Opeyemi A. Boboye Fatoba, Abisoye Blessing O. Design of a Computerized Inventory Management System for Supermarkets. International Jounal of Science and Research (IJSR) India Online ISSN:2319-7064.
[2] Lawrence Imeokparia. Inventory Management System and Performance of Food and Beverage Companies in Nigeria. IOSR Journal of Mathematics (IOSR JM).e-ISSN:2278-5728, Volume 6, Issue 1 (Mar-Apr, 2013), PP24-30.
[3] Souvik Paul, Atrayee Chatterjee, Digbijay Guha. Study of Smart Inventory Management System Based On The Internet Of Things (IoT). Vol 3 No 3 (2019): International Journal on Recent Trends in Business and Tourism.
[4] Jose L Gonzales and Daniel Gonzales. Analysis of an Economic Order Quantity and Reorder Point Inventory Control Model for Company XYZ. California Polytechnic State University San Luis Obispo.
[5] Robinson, S., “Soft with a hard centre: discrete-event simulation in facilitation”, Journal of the Operational Research Society, vol. 52, pp. 905-915 , 2001.
[6] IEEE-STD-610, A Compilation of IEEE Standard Computer Glossaries, IEEE Standard Computer Dictionary, 1991.