

III. RESULTS AND DISCUSSION

This section describes the research results and discussions related to the implementation of the designed system. The absence of a policy regarding the maximum limit of raw material inventory also has an impact on the suboptimal utilization of storage space and causes an increase in total inventory costs [9]. Through needs analysis and a structured approach, this application is expected to provide an efficient solution in managing inventory data at PT Hesed Indonesia. The following are the stages of implementation and in-depth discussion of the workflow and benefits of the system being developed.

1.1 Needs Analysis

The first step in system development is to analyze the needs to understand the business processes that occur at PT Hesed Indonesia related to the management of finished goods inventory. Based on the results of observations and interviews with the warehouse and managerial staff, it is known that the existing inventory management system is still done manually using Microsoft excel. This causes less than optimal ordering decisions because they are not based on precise mathematical calculations such as the EOQ method. In addition, manual recording also results in the accumulation of documents, which hampers the data search process because it takes longer [10]. Therefore, the system needed is a system that is able to provide optimal order quantity recommendations automatically and accurately.

1.2 Data Collection

The data that needs to be collected are:

- a. Goods demand data per year (D)
- b. Ordering costs per transaction (S),
- c. Storage costs per unit per year (H).

The data is collected from internal company documents such as order reports and warehouse costs. This data is the main parameter in the EOQ calculation for each finished goods item managed by the company.

1.3 System Design

This system is designed to increase the efficiency of the amount of costs incurred to meet ordering or order quantity needs by optimizing workflows that previously used manual methods. The process begins with the admin inputting data into the system such as annual demand data, ordering costs per transaction, and storage costs per unit per year. After entering the data the system will be able to automatically calculate the EOQ results. If the admin wants to enter a large amount of data at once the system already has excel with a customized template. With this workflow, the calculation process that previously used manual methods and took longer is now more structured and efficient.

1.4 Implementation

The system that has been designed is then implemented in the form of a web application using the php programming language. The system interface allows users to enter requirement data, and the system automatically displays the results of EOQ calculations and ordering recommendations. The system is tested locally in the warehouse environment using real data from the company.

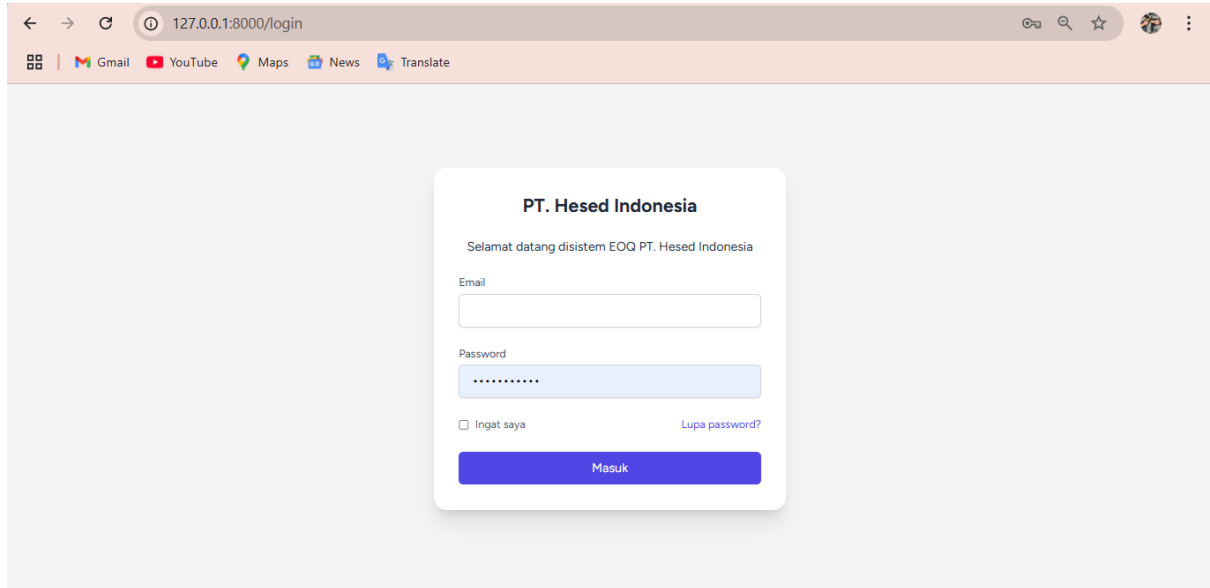


Figure 1. Login page menu

The EOQ system for PT Heses Indonesia has been successfully built and run in a local web environment using the address 127.0.0.1:8000/login. The following figure shows the appearance of the system login page which is the entrance for registered users to access the features of the decision support system.

The figure shows the login interface which is designed in a simple and responsive manner. At the top is the company name "PT Heses Indonesia", followed by the welcome message "Welcome to PT Heses Indonesia's EOQ system" as an affirmation of the application context. The login form consists of two main inputs, namely *Email* and *Password*, as well as additional features "Remember me" and "Forgot password?" links for user convenience.

After the user enters valid credentials and presses the "Login" button, the system verifies the login information and directs the user to the main page to access the EOQ calculation menu, data input, and reports. This process ensures that only authorized users can use the system, in line with information security principles.

The implementation of this login page is an important part of the system, because it serves as an access authorization filter, while providing a professional and easy-to-use initial experience for warehouse staff and management involved in inventory management.

EOQ System Data Barang Hitung EOQ Riwayat ID Logout

Data Barang Tambah Barang Cari

Kode Barang	Nama Barang	Jumlah Pesanan	Biaya Pesan	Biaya Simpan	Aksi
DG52K012	GIRLS 55% COTTON 45% POLYESTER KNITTED SWEATSHIRT	31.490	1.731.950.000	129.896.250	Edit Hapus
JG53A201 (254201)	WOMENS 55% COTTON 45% POLYESTER KNITTED HOODIE	34.062	1.873.410.000	140.505.750	Edit Hapus
JG53A200	WOMENS 55% COTTON 45% POLYESTER KNITTED HOODIE	96.306	5.296.830.000	397.262.250	Edit Hapus
JG53A206	WOMENS 55% COTTON 45% POLYESTER KNITTED PANTS	50.260	2.764.300.000	207.322.500	Edit Hapus
DG44J006	GIRL 94% COTTON 4% SPANDEX KNITTED SKIRTS	138.130	5.525.200.000	414.390.000	Edit Hapus
JG42A103 (253103)	WOMENS 55% COTTON 45% POLYESTER KNITTED PULLOVERS	52.014	2.340.630.000	175.547.250	Edit Hapus
JG53A201	WOMENS 55% COTTON 45% POLYESTER KNITTED HOODIE	64.996	3.574.780.000	268.108.500	Edit Hapus
JG43A110 (253110)	WOMENS 55% COTTON 45% POLYESTER KNITTED CARDIGANS	40.794	2.039.700.000	152.977.500	Edit Hapus
DG52K035	WOMENS 55% COTTON 45 % POLYESTER KNITTED SWEATSHIRT	800	44.000.000	3.300.000	Edit Hapus

Figure 2. Item data and item input

In addition to the login page, the EOQ system that has been built also provides a main page that displays item data. The figure shows the interface of the "Item Data" page, which is the section

that displays all information on inventory items that will be calculated for the optimal order quantity using the EOQ method.

On this page, users can view a list of goods in the form of a table consisting of several columns, including:

- Item Code:** a unique code for product identification,
- Item Name:** complete product description,
- Order Quantity:** total product demand per year,
- Order Cost:** the cost of each order,
- Storage Cost:** estimated storage cost per unit per year.

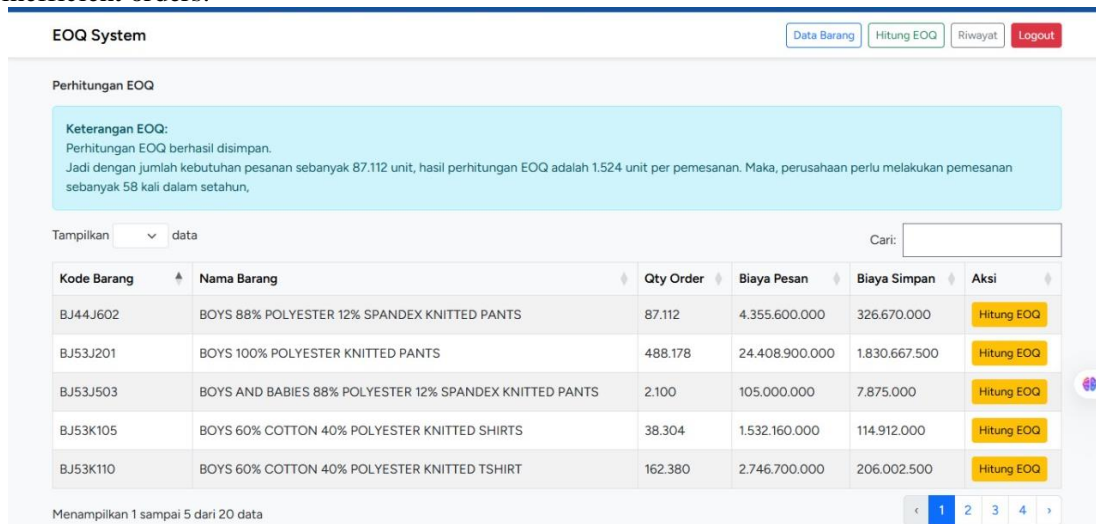
At the top of the page, there is an "Add Item" button to enter new data, as well as a search feature with input fields and a "Search" button to facilitate users in searching for specific items.

Each row of item data is equipped with two action buttons, namely the "Edit" button (in yellow) which is used to update item data, and the "Delete" button (in red) to remove items from the list. The system design is responsive and easy to use by non-technical users such as warehouse staff or production planning.

Through this page, all data needed for the EOQ calculation process can be inputted and managed quickly and efficiently. This data will be the main input to the EOQ calculation process and displayed in the recommendation results in other parts of the system.

1.5 Testing And Trial

In addition, the EOQ calculation results from the system were validated with manual calculations to ensure accuracy. The test results show that the system can provide recommendations for ordering quantities that are more optimal than the previous approach, and can reduce the number of inefficient orders.



The screenshot shows the 'EOQ System' interface. At the top right, there are navigation buttons: 'Data Barang', 'Hitung EOQ', 'Riwayat', and 'Logout'. The main content area is titled 'Perhitungan EOQ' and contains a light blue notification box with the following text: 'Keterangan EOQ: Perhitungan EOQ berhasil disimpan. Jadi dengan jumlah kebutuhan pesanan sebanyak 87.112 unit, hasil perhitungan EOQ adalah 1.524 unit per pemesanan. Maka, perusahaan perlu melakukan pemesanan sebanyak 58 kali dalam setahun.' Below the notification, there is a search bar and a table of items. The table has columns for 'Kode Barang', 'Nama Barang', 'Qty Order', 'Biaya Pesan', 'Biaya Simpan', and 'Aksi'. Each row represents a different item with its respective data and a 'Hitung EOQ' button.

Kode Barang	Nama Barang	Qty Order	Biaya Pesan	Biaya Simpan	Aksi
BJ44J602	BOYS 88% POLYESTER 12% SPANDEX KNITTED PANTS	87.112	4.355.600.000	326.670.000	Hitung EOQ
BJ53J201	BOYS 100% POLYESTER KNITTED PANTS	488.178	24.408.900.000	1.830.667.500	Hitung EOQ
BJ53J503	BOYS AND BABIES 88% POLYESTER 12% SPANDEX KNITTED PANTS	2.100	105.000.000	7.875.000	Hitung EOQ
BJ53K105	BOYS 60% COTTON 40% POLYESTER KNITTED SHIRTS	38.304	1.532.160.000	114.912.000	Hitung EOQ
BJ53K110	BOYS 60% COTTON 40% POLYESTER KNITTED TSHIRT	162.380	2.746.700.000	206.002.500	Hitung EOQ

Menampilkan 1 sampai 5 dari 20 data

Figure 3. EOQ Calculation

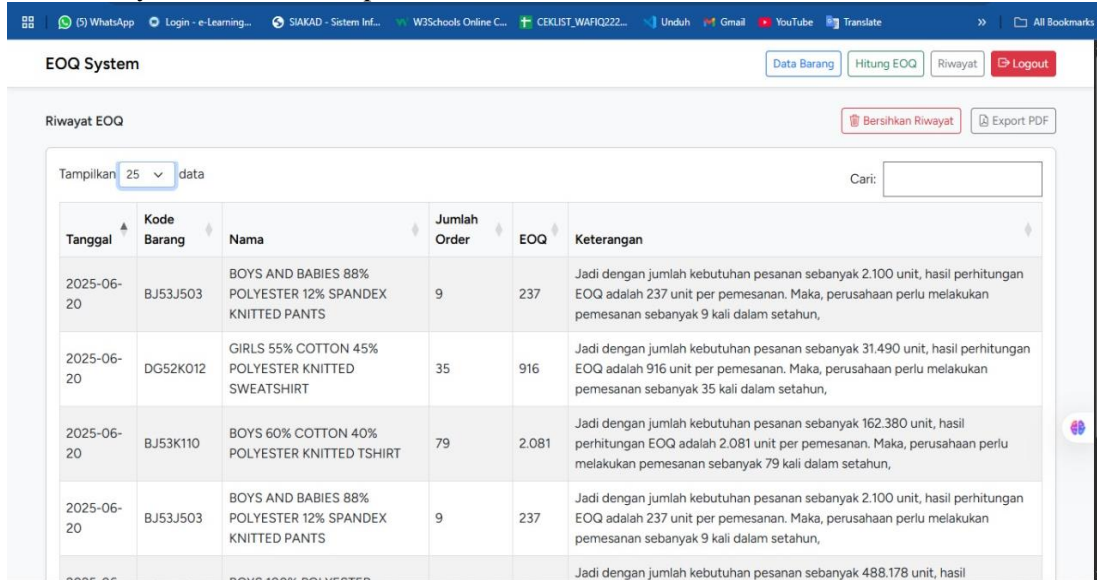
In the testing phase, the system is tested to ensure the EOQ calculation functionality runs well according to the given parameters. The figure displays the *EOQ Calculation* page which is the core part of the decision support system. On this page, users can see the calculation results directly based on input data in the form of annual demand, ordering costs, and storage costs.

The system displays a notification in the form of an EOQ statement in the form of a narrative sentence explaining the calculation results. For example in the figure, if the total annual requirement is 87,112 units, then the EOQ calculation results show that the optimal quantity of orders is 1,524 units per order. The system also automatically calculates the number of ordering cycles required, in this case 58 times a year. This information is very helpful in strategic decision-making because it combines the mathematical approach of EOQ with easy-to-understand visualizations.

In addition, the table below the notification area displays a complete list of items along with important attributes such as item code, item name, quantity needed (Qty Order), ordering cost, and storage cost. On each row of data, there is a "Calculate EOQ" button that allows users to perform individual calculations for each item.

Tests were conducted using actual data from the company and compared the results with manual calculations using the EOQ formula. The test results show that the system is able to provide accurate and consistent results with the calculation formula. In addition, the system provides operational convenience for users, because the calculation process that usually takes time can now be done with just one click.

Through this test, it can be concluded that the system works well, both in terms of calculation logic, user interface, and reliability in saving calculation results into the system. This shows that the system is ready to be used in an operational context within PT Hesed Indonesia.



Tanggal	Kode Barang	Nama	Jumlah Order	EOQ	Keterangan
2025-06-20	BJ53J503	BOYS AND BABIES 88% POLYESTER 12% SPANDEX KNITTED PANTS	9	237	Jadi dengan jumlah kebutuhan pesanan sebanyak 2.100 unit, hasil perhitungan EOQ adalah 237 unit per pemesanan. Maka, perusahaan perlu melakukan pemesanan sebanyak 9 kali dalam setahun,
2025-06-20	DG52K012	GIRLS 55% COTTON 45% POLYESTER KNITTED SWEATSHIRT	35	916	Jadi dengan jumlah kebutuhan pesanan sebanyak 31.490 unit, hasil perhitungan EOQ adalah 916 unit per pemesanan. Maka, perusahaan perlu melakukan pemesanan sebanyak 35 kali dalam setahun,
2025-06-20	BJ53K110	BOYS 60% COTTON 40% POLYESTER KNITTED TSHIRT	79	2.081	Jadi dengan jumlah kebutuhan pesanan sebanyak 162.380 unit, hasil perhitungan EOQ adalah 2.081 unit per pemesanan. Maka, perusahaan perlu melakukan pemesanan sebanyak 79 kali dalam setahun,
2025-06-20	BJ53J503	BOYS AND BABIES 88% POLYESTER 12% SPANDEX KNITTED PANTS	9	237	Jadi dengan jumlah kebutuhan pesanan sebanyak 2.100 unit, hasil perhitungan EOQ adalah 237 unit per pemesanan. Maka, perusahaan perlu melakukan pemesanan sebanyak 9 kali dalam setahun,

Figure 4. EOQ calculation result and its description

In addition to testing the EOQ input and calculation features directly, the system also provides an EOQ History page as a complementary feature that allows users to review all EOQ calculation results that have been performed. The following figure shows the appearance of the page which functions as an automatic log or archive of the finished goods ordering decision-making process.

This page displays a table containing columns Date, Item Code, Item Name, Order Quantity, EOQ, and Remarks. The "Description" column presents descriptive information that explains the results of the EOQ calculation and how many times the company should place an order in a year. For example, if the annual requirement is 2,100 units and the EOQ calculation result is 237 units, the system automatically calculates that the company needs to place an order 9 times a year.

This feature is very helpful in the context of **verifying test results** because it allows users to compare calculation histories between items quickly and systematically. In the trial, various combinations of data with varying demand values, ordering costs, and storage costs were inputted to test the consistency of the system calculations. All results were successfully saved and can be exported into PDF format via the Export PDF button, and can be cleaned manually with the Clear History feature.

From the results of this test it can be concluded that the system is not only able to perform EOQ calculations accurately, but also store the results in a structured manner. This is an added value in terms of audit trail and decision data security, because all processes carried out are well documented and can be reviewed at any time by authorized users.

1.6 Maintenance

After implementation and testing, the system enters the maintenance phase. Maintenance activities include minor bug fixes, adjustments to system parameters according to actual data changes, and feature enhancements based on user feedback. The system is flexible for further development, such as integration with the demand forecasting module or connection to the company's inventory system in real-time.