AUTOMATION WORK ORDER AND MASTER PRODUCTION SCHEDULE IN ENTERPRISE RESOURCES PLANNING FOR PT SFP

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Abstract—In today's dynamic business landscape, manufacturing enterprises like PT SFP face the constant challenge of optimizing their production processes to remain competitive. The Enterprise Resources Planning (ERP) architecture will be used to develop an integrated solution to automate work order administration and master production scheduling. The production and planning division is a very important process and is interconnected with one another. Since manufacturing is the most demanding business process in a company's activities, the significance of the planning system is greatly raised. Even though the company already has an ERP system that is quite integrated, there are still many processes that are still carried out offline which causes manual inefficiency, this not only increases waiting time but can also cause anomalies. This project provides ERP development ideas, especially in the Production and Planning module for PT SFP by implementing automation and integration in the work order planning workflow to improve business processes. It includes the business process of creating Order Confirmation (OC) Receiving Date Input, and automation of planning work order creation, usage standards in the work order and the work order itself. This system is expected to be more effective and efficient in the field of production planning using ERP web-based that can be accessed online.

Keyword: ERP, Production Planning, Work Order

I. INTRODUCTION

Every company needs management production planning for the continued running of production activities. This is necessary because the implementation of the production process of a company is also influenced by the existing production system within the company. Therefore, planning the production process (production planning) in the company concerned is very useful for determining the best production pattern.

In today's highly competitive business and digital environment, manufacturing companies face many challenges in managing their operations effectively. Managing huge amounts of data and information produced by numerous processes and systems within a business is one of the biggest problems.

By giving firms a single, integrated platform for managing crucial business activities, ERP systems can be a vital enabler of digital transformation.
Even though the company already has an ERP system that is quite integrated, there are still many processes that are still carried out offline which causes manual inefficiency, this not only increases waiting time but can also cause anomalies.

Implementing automation and integration in the work order planning workflow, it is expected to improve business processes and is expected to be more effective and efficient in the field of production planning using the Internet.

II. LITERATURE REVIEW

2.1. Enterprise Resources Planning

Enterprise Resource Planning (ERP) is a platform used by businesses to coordinate and manage the important elements of their operations. For optimum efficiency, this software will assist firms in managing and automating their main business activities. An ERP system has a central database for the whole information flow in the organization reducing data redundancy and increasing flexibility.

2.2. Production Planning

Production planning is one of the most important forms of operations management, which is a tool that can be used by the company to direct the production system with a comprehensive planning and comprehensive control system. For the production process to run smoothly, production planning must really be organized systematically. Companies need to make effective strategies in utilizing production planning so that the production process can be in accordance with the things that have been predicted.

2.3. Current Gap or Problem

- The Order Confirmation (OC) file confirmation process still uses paper which is a very high risk of loss and damage.
- Frequently get repeat orders that use work order records that have previously been done.
- The ERP system currently used is desktop-based, so each user can only access ERP through a computer that has installed the ERP application.

2.4. Related Work

Figure 2. 1 ERP desktop-based

Figure 2.1 is a screenshot of the desktop-based ERP system of PT. SFP

2.5. Comparison Overview

Table 2. 1 Comparison Overview between desktop-based ERP with web-based ERP

Feature	ERP Desktop-based	ERP web-based
Integrated modules	✓	✓
Input Order Confirmation	✓	✓
Used on multi-platform	-	✓
OC confirmation via the system	-	✓
Automatically Generate Work Order	-	✓

II. SYSTEM ANALYSIS

The system will implement web-based Enterprise Resources Planning (ERP) using the internet to make transactional activity become more integrated, automated, and fraud-free between marketing, production and planner. The following features will be implemented by this application to help the user in tracking and monitoring the frequency testing of incoming part:

- Provide user login
- Provide input order confirmation receipt date
- Display the status of order confirmation
- Provide reset the status of the order confirmation
- Provides input of estimated delivery date by PPIC
- Display information regarding the material calculation
- Provides features for automatically creating work orders, material usage standards and production planning
- Provides features for automatically input the master production schedule into database

Figure 3. 1 Use Case Diagram

III. SYSTEM DESIGN

System Design is a stage that describes how a system will be formed. This stage is one of the important stages in system development because it is the basis that represents the business logic of the software.

4.1. UI Design of Login Page

Figure 4. 1 User Interface of Login Page

4.2. UI Design of Page

Figure 4. 2 User Interface of Dashboard Page

4.3. UI Design of Production Module Page

Figure 4. 3 User Interface of Production Module Page

4.4. UI Design of Input OC Receipt Date Menu

Figure 4. 4 User Interface of Input OC Receipt Date Menu

4.5. UI Design of Lookup Input OC

Figure 4. 5 User Interface of Lookup Input OC

4.6. UI Design of Reset OC Data to NEW

Figure 4. 6 User Interface of Reset OC Data to NEW

4.7. UI Design of Confirm OC & Generate Work Order

Figure 4. 7 User Interface of Confirm OC & Generate Work Order

4.8. UI Design of Confirm OC & Generate Work Order-Sub Menu

Figure 4. 7 User Interface of Confirm OC & Generate Work Order - Sub Menu

4.9. UI Design of Reset OC Data to RECEIVED

Figure 4. 7 User Interface of Reset OC Data to RECEIVED

4.10. UI Design of Upload/Download MPS Menu

Figure 4. 7 User Interface of Upload/Download MPS Menu
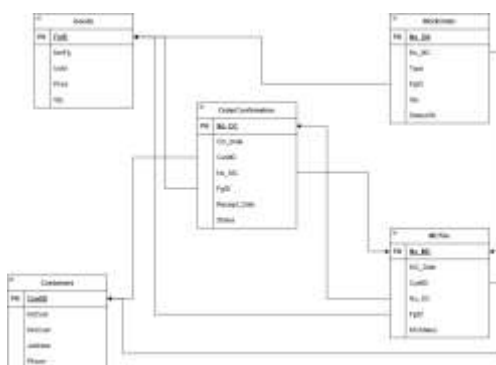
4.11. Entity Relationship Diagram

Figure 4. 8 User Interface of Entity Relationship Diagram

4.12. Database Design

OrderConfirmation		
ATTRIBUTE	**DATA TYPE**	**RELATION/INDEX/DESCRIPTION**
No_OC	CHAR	PRIMARY KEY
OC_Date	DATE	
CustID	VARCHAR	FOREIGN KEY
No_MC	VARCHAR	FOREIGN KEY
FgID	VARCHAR	FOREIGN KEY
Receipt_Date	DATE	
Status	VARCHAR	

MCFile		
ATTRIBUTE	**DATA TYPE**	**RELATION/INDEX/DESCRIPTION**
No_MC	CHAR	PRIMARY KEY
MC_Date	DATE	
CustID	VARCHAR	FOREIGN KEY
No_OC	VARCHAR	FOREIGN KEY
FgID	VARCHAR	FOREIGN KEY
MCStatus	VARCHAR	

Customers		
ATTRIBUTE	**DATA TYPE**	**RELATION/INDEX/DESCRIPTION**
CustID	CHAR	PRIMARY KEY
KdCust	VARCHAR	
NmCust	VARCHAR	
Address	VARCHAR	
Phone	CHAR	
MCStatus	VARCHAR	

Goods		
ATTRIBUTE	**DATA TYPE**	**RELATION/INDEX/DESCRIPTION**
FgID	CHAR	PRIMARY KEY
NmFg	CHAR	FOREIGN KEY
UoM	VARCHAR	
Price	VARCHAR	
Qty	CHAR	

WorkOrder		
ATTRIBUTE	**DATA TYPE**	**RELATION/INDEX/DESCRIPTION**
No_OK	CHAR	PRIMARY KEY
No_MC	CHAR	FOREIGN KEY
Type	VARCHAR	
FgID	VARCHAR	
Qty	CHAR	
StatusOK	VARCHAR	

IV. SYSTEM IMPLEMENTATION

This Chapter describes the implementation phase of the development of the Web-based ERP System. This application was created with PHP as a programming language, Docker as a container.

5.1. Login Page

Figure 5. 1 User Interface of Login Page

5.2. Dashboard Page

Figure 5. 2 User Interface of Dashboard Page
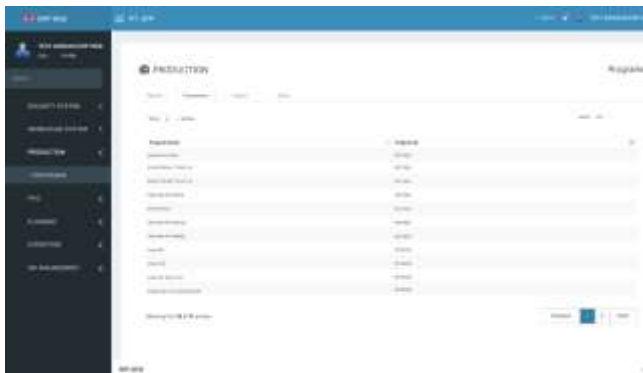
5.3. Production Module Page

Figure 5. 3 User Interface of Production Module Page

5.4. Input Order Confirmation (OC) Receipt Menu Page

Figure 5. 4 User Interface of Input Order Confirmation (OC)Receipt Menu Page

5.5. Lookup Input Order Confirmation Menu Page

Figure 5. 5 User Interface of Lookup Input Order ConfirmationMenu Page

5.6. Reset Order OC Data Notification

Figure 5. 6 User Interface of Reset Order OC Data Notification

5.7. Confirm OC & Generate Work Order Sub Menu Page

Figure 5. 7 User Interface of Confirm OC & Generate Work OrderSub Menu Page

5.8. *Upload/Download MPS Menu Page*

Figure 5. 7 User Interface of Upload/Download MPS Menu Page

V.   SYSTEM TESTING

In developing a system or application, testing activities are needed to assess the functionality of a system. Testing is a measuring tool in determining the quality and reliability of the system.

6.1. *Testing Environment*

Test environment is where the tester analyzes the quality of the application/program. A test environment allows the developers to check how a code/program will behave in a live environment. For this system testing, environment specifications as follows:

- Microsoft Windows 7 Operating System (OS) 64-bit
- Google Chrome and Microsoft Edge
- Docker 12

6.2. *Testing Summary*

The application has been tested, and the results are as expected. For example, users can already log in, input OC receipt, confirm OC and generate the work order, read and download data MPS from server, import, read and upload data MPS from Excel.

VI.   CONCLUSION & FUTURE WORK

7.1. *Conclusion*

ERP has an important role in the running of operations in manufacturing companies. The proposed system has successfully improved efficiency and effectiveness in PT SFP's production planning business process through web-based ERP. This application helps users in the process of creating repeated work orders. Additionally, menus such as Input Date of Receipt Order Confirmation (OC), Confirm Order Confirmation (OC) & Generate Work Order help reduce errors in inputting that was previously done manually. And, with this menu reduces the potential loss of data because the paper used for OC confirmation is lost or damaged. Overall, this web-based ERP becomes more flexible because it can be accessed through various platforms so that users do not need to install the application on their respective desktops.

7.2. *Future Work*

Based on the successful implementation of the Automation Work Order and Master Production Schedule in ERP system, there are several suggestions that can be considered to further improve the system's functionality and user experience:

1. Migrate all desktop ERP menus to web ERP to make it more effective and more integrated.
2. Create a high security program to safeguard confidential company data, especially when this application is used online.

REFERENCES

[1] Rawat, "Role of ERP Modernization in Digital Transformation: PeopleSoft Insight," Int. J. Comput. TrendsTechnol., vol. 71, no. 02, pp. 61–67, 2023, doi: 10.14445/22312803/ijctt-v71i2p110.

[2] M. B. Soeltanong and C. Sasongko, "Perencanaan Produksi dan Pengendalian Persediaan pada Perusahaan Manufaktur,"

[3] J. Ris. Akunt. Perpajak., vol. 8, no. 01, pp. 14–27, 2021, doi: 10.35838/jrap.2021.008.01.02.

[4] N. V. Syreyshchikova, D. Y. Pimenov, T. Mikolajczyk, and L. Moldovan, "Automation of production activities of an industrial enterprise based on the ERP system," Procedia Manuf., vol. 46, no. 2019, pp. 525–532, 2020, doi: 10.1016/j.promfg.2020.03.075.