

# **Production Monitoring Information System: Managing Supply and Demand in the Textile Factory**

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## **Abstract**

Monitoring aims to assess whether the activities carried out to follow the plan to achieve certain goals, Monitoring will provide information about the status and evaluation that is completed repeatedly from time to time, to check the ongoing process. At PT. PopStar lacks information from each part of the production, raw materials that are not integrated with the number of incoming orders will experience problems in the production schedule and result in orders not being completed on time, this results in losses for the company. In this production information system, the system development method used is a waterfall, the data collection method uses interviews and observations. The output of this system is to be able to manage, monitor, and integrate raw material data for each department involved. In the implementation of the system based on the results of acceptance, the tests obtained produced some percentage of the highest level of acceptance, namely the production users and production managers at 82.76%. This study will be further developed in more accurate scheduling calculations, customer complaints features, and payment features.

## **Keywords**

*Production, Monitoring System, Pt.PopStar*

## **1. Introduction**

Monitoring is a process carried out to be able to make measurements through time that shows movement towards the goal. Monitoring will provide information about the status and tendency that measurements and evaluations are completed repeatedly over time, to check the following processes of objects to evaluate the conditions of progress towards which is running (Arifin and Jaja 2018). From various manufacturing industries in Indonesia, such as companies engaged in the garment industry, there appears to be a communication gap and cooperation between divisions in the companies responsible for providing information relating to the company's production (Hendrawan and Khalidun n.d.). Monitoring can improve control in a process (Iwu 2019). Production is the most important part of a manufacturing company, wherein conducting its production activities the company is producing (Hakim et al. 2018), based on requests from customers (Meyer, Hans Wortmann, and Szirbik 2011). In the production process, the company is required to be able to produce a product following consumer desires. To run the production process, the company requires raw materials to be processed into products with added value (Daud 2017), which might be related to resources and work (Snatkin, Karjust, and Eiskop 2012), And product quality also greatly influence the level of success in competition in the business world (Ekonomi et al. 2019). In the process of monitoring its development from conventional to digital, which already uses information technology. (Adhi, Susanto, and Rahmawan n.d.) This development encourages the industry to implement an effective and efficient manufacturing system that can speed up the production process. Currently, the monitoring information system can be used to solve problems such as production (Studi et al. 2019), asset and inventory data (Ilmiah et al. 2013), Student attendance (Diariono 2010), inventory data (Rohayati 2014), and health (Fanny, Adi, and Jati n.d.). PT. PopStar currently still has a problem, namely not integrating raw materials in the warehouse with incoming messages and will result in the disruption of production schedules. There is another problem, namely in controlling raw materials. To avoid fraud, shortages, excess raw materials to reduce losses to the company and cause delays in the production process. In previous studies, monitoring systems can be used to monitor the amount of cracker production that has applied sensors to detect cracker chips and laser light sources directed at the sensor. The results will be displayed on a computer screen to find out the number of wet crackers that have been produced (Delphi 2011). Other research also discusses the use of a monitoring

system in the process of monitoring the production of acrylic which produces products from acrylic materials. The monitoring system is used to monitor production activities from ordering to shipping (Legowo and Yoga 2012). Although there have been many studies concerning the production monitoring system (Hery, Endi, and Niel 2014) until now there has not been much mention about the supply of raw materials, information about production implementation, information between departments and parties involved in the production process, especially when an error occurs giving information from each department involved in the production process.

This research was conducted aimed at resolving the problems that exist in PT. PopStar starts from controlling raw materials, manufacturing products, and production reports, namely by creating a monitoring information system at PT. PopStar which can support the production process, especially the use of raw materials, and overcome the delays in information on the availability of raw materials. The benefits of this research can help monitor the production process well and time efficiency in the process of collecting stock of raw materials in the production process

## 2. Research Method

This study uses data collection and consists of interviews and observations. The interview process took place at PT. PopStar in the Nanjung area Margaasih District, Bandung Regency, West Java Province, and conducted on February 13, 2020, then on February 20, 2020. Each interview takes 1 hour. At each meeting asking various topics such as business processes, organizational profiles and organizational structure, vision and mission, problems that exist in the company, the activities of actors, and defining the flow of activities in the production department. In addition to interviews also conducted observations that took place at PT. PopStar on the 24th to 28th February 2020. This observation activity got more phenomena that were not mentioned by the interviewees previously. The results of observations are recorded and summarized and validated to informants who have been interviewed before.

### 2.1 Business Process Identification and System Objective

The process of identifying business processes is the stage that needs to be done to find out the processes that occur in an organization, especially in software development (Nurmadewi and Mahendrawathi 2019). At PT. PopStar in its production starts from the order that has been received by the marketing department from the customer, then the order will be sent to the production manager for approval or not. After the order is approved, it will be sent to the plan to check the raw material, cloth, accessories, and to plan the production schedule. If the raw material is lacking, the order will be postponed first, after the checking is complete and the schedule has been made, then the production department will process it to make a pattern such as a shirt or pants, after that it is cut according to a predetermined pattern, then bundled or tied to the same pattern and then loading, determining the fabric and accessories needed, then sewing (tailoring) after which the product must go through QC (Quality Control) to determine which products are suitable for packing, and not suitable as defects, not by the order, the product fails and after it's the delivery process

Table 1. Problems found during identification of business processes

No	Problems Found	Description
1	The order amount does not match	The number of products produced does not match the message received
2	Information on product progress and raw materials	not much information about the progress of production

From the results of table 1 that have been obtained, after that, we make a goal that must be done so that the making of this information system can be achieved, which can be seen in table 2

Tabel 2. Objectives of the Integrated system monitoring production

No	Objective Description	Solving Problem No-
1	To monitor and manage the production process	1, 2
2	To provide information about the progress of production to each department and parties involved	1
3	A web-based system that can be accessed by all parties involved	1,2

## 2.2 System Design

The design of the system related to the design of the user interface (user interface) is part of the system that connects the user to the computer (Saputra and Budiawan n.d.) and the translator needs data that has been analyzed in a form that is easy to understand can be seen in table 3.

This table is used to store data that has already been made by the planning department in part during the production reference

Table 3. Database Design Production Table

No	Nama Field	Type	Length	Index	Keterangan
1	Id_production	Int	11	PK	Not Null,
2	Id_booking	Int	11	FK	Not Null,
3	raw_material	Text	25		Not Null,
4	cutting	Text	25		Not Null,
5	accessories	Text	25		Not Null,
6	sewing	Text	25		Not Null,
7	qc	Text	25		Not Null,

This table is used to store data that has been created by the marketing department that will be given to the planning department

Table 4. Database Design Order Table

No	Nama Field	Type	Length	Index	Keterangan
1	id_order	Int	15	PK	Not Null,
2	no_order	Text	25		Not Null,
3	buyer	Text	20		Not Null,
4	style	Text	20		Not Null,
5	date_booking	Date	-		Not Null,
6	status	Text	10		Not Null,
7	qty	Text	10		Not Null,

This table is used to store data that has been created by the warehouse department which can be used to determine the stock of raw materials that will be used

Table 5. Database Design Raw Material Table

No	Nama Field	Type	Length	Index	Keterangan
1	id_bahan	Int	15	PK	Not Null,
2	id_style	int	25	FK	Not Null,
3	name	Text	20		Not Null,
4	qty	Text	20		Not Null,

### 2.2.1 Actor's Identification.

The stage of analyzing the actors who will interact with the system (Backtiar et al. 2014). Analysis of the current system user is an explanation of who are the actors involved in the current system. Based on the results of the analysis of the system that runs on PT.PopStar has done it, so it gets concluded who are the actors involved in the system and each task of each department. can be seen in table 6

Table 6. user analysis

No	Actor	Description	Mentioned in
1.	Production Manager	Conduct an ongoing production monitoring process for the order to be produced and approve the order	Make a third observation
2.	Marketing	Perform the process of receiving orders from customers	Resource persons from interview questions to the second part of planning
3.	Planning section	Conduct a production planning process for orders to be produced by the production department by making production plans to fit the specified time	Resource persons from interview questions to the 4 parts of the production section
4.	Production Section	Carry out a production process for orders received	Resource persons from interview questions to the 4 parts of the production section
5.	Warehouse Section	Save stock of raw materials	Resource persons from interview questions to the 4 parts of the production section
6.	Cutting	Doing the process of making patterns, arranging, binding patterns and cutting patterns	Resource persons from interview questions to the 4 parts of the production section
7.	Accessories	Make the selection of accessories used in an order	Resource persons from interview questions to the 4 parts of the production section
8.	Sewing	Stitching products	Resource persons from interview questions to the 4 parts of the production section
9.	QC	Test the products made to order and the products that have been produced based on the product design layout that has passed the previous test and carry out the finishing process and then produces a production report.	Resource persons from interview questions to the second part of the planning section

### 2.2.2 Functional Analysis.

Based on the analysis of actors involved in the software to be built. The software to be built must follow user requirements. Functional analysis is based on existing processes in the system that runs during the production process at PT. PopStar. Based on the results of the analysis of the current system, it can be concluded that the function found in the current system at PT. PopStar seen in table 7

Table 7. functional analysis

No	Actor	Description	Solving Objective No-
1.	Manage Marketing	Make and receive incoming orders	2,3
2.	Manage Planning	Plan the schedule of orders that have been received	1,3
3.	Manage Production	Production process against orders	2,3
4.	Manage Warehouse	Preparing raw materials	2,3
5.	Manage Cutting	Making patterns, arranging, binding patterns and cutting patterns	2,3
6.	Manage Accessories	Selection of accessories used in an order	2,3
7.	Manage sewing	Product tailoring	2,3
8.	Manage QC	Test the products that have been made to order and carry out the finishing process	2,3
9.	Manage Reports	production report	2,3

### 2.3. System Development

In this study the testing was done using a personal computer, the implementation phase using the PHP programming language with an editor was Visual Studio for the framework using Laravel, MySQL database as a storage area, Apache Web Server, Google Chrome / Mozilla Firefox as a Web browser media.

## 3. Results and Discussions

The design and manufacture of systems in this study were completed in the last 3 months wherein the testing phase it uses 2 techniques namely by using system testing and user acceptance testing where this test is to determine the success categories in testing, design quality testing, implementation of tests and conclusions from the results quality testing

### 3.1. Production Monitoring Systems

Implementation of interface design is the application of interface design results (Diponegoro 2012). On the order management page, there is a process in which the marketing department processes the receipt of orders from customers and gives the manager so that the order can be received or not. After being approved by the production manager an order will be sent to the production planning department to be made a production schedule then the schedule will be sent to each section of the production and at each stage of production will provide production status. After the production is finished, the QC will carry out a checking process which has already been produced, to ensure the quality of the finished order, then the results of the check will be reported to the production manager. Each user must first fill in their username and password as depicted in Figure 1

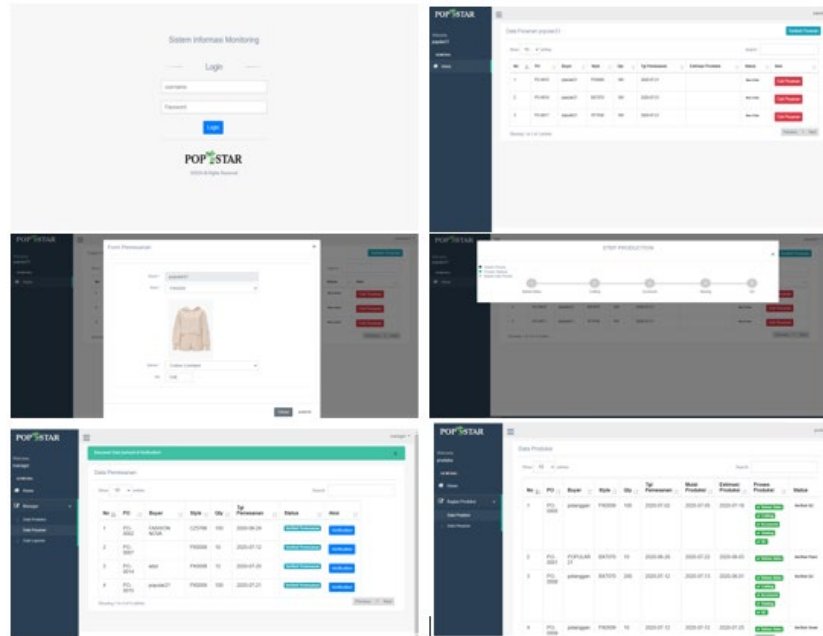
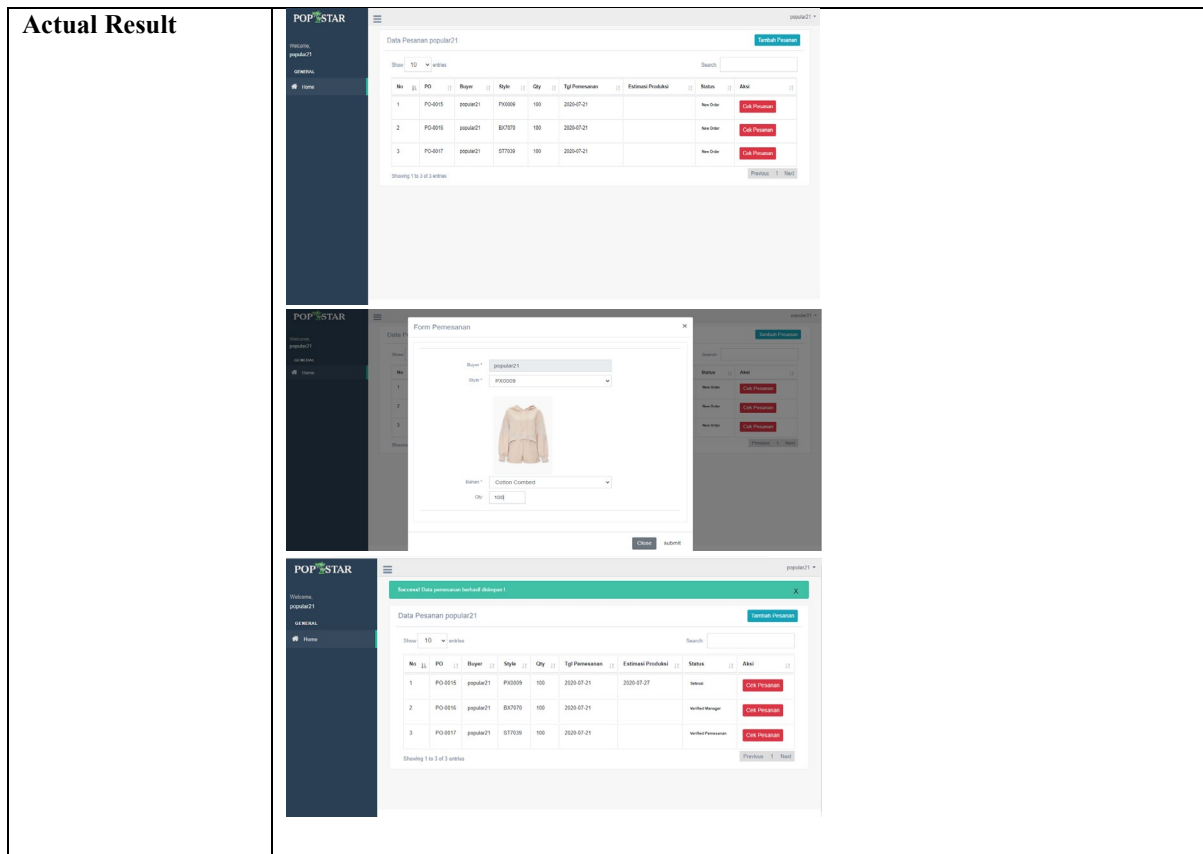


Figure 1 Production monitoring information system

There is also warehouse management to ensure the availability of raw materials. After that, there is a management plan to carry out a production planning process for the order to be produced by the production department by making a production schedule following the specified time, managing the production to monitor the process that has been carried out when the order is made until the order is finished

Table 8 Skenario test case add order function

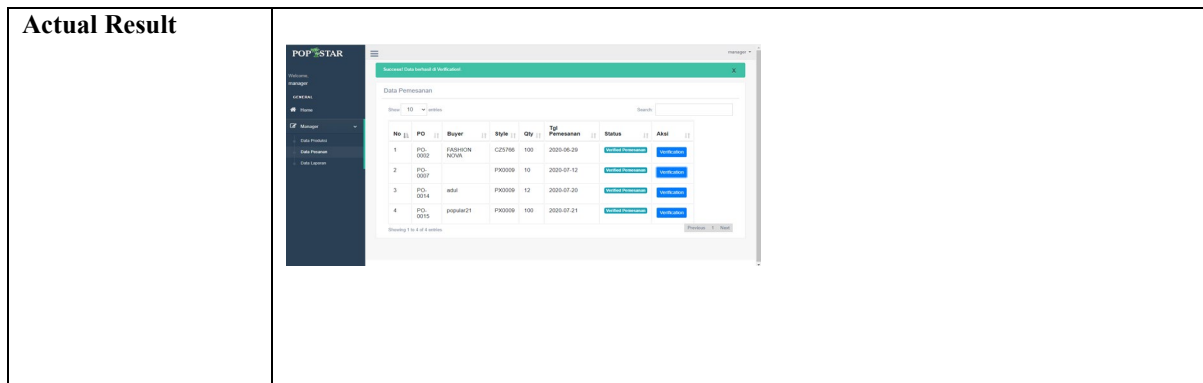
<b>Use Case ID</b>	PO001
<b>Use Case Name</b>	Add Order
<b>Test Scenario</b>	Test the use case manage orders on the order add function
<b>Test Case</b>	Enter data in the correct and complete format
<b>Pre-Condition</b>	Po data is empty
<b>Test Steps</b>	1. Press the add order button 2. Fill in the order data 3. Click "submit"
<b>Test Data</b>	1. Fill in the buyer <"Popular21"> 2. Fill in style<"PX0009 "> 3. Fill in the material<"cotton combed "> 4. Fill in the qty <"100 ">
<b>Expected Result</b>	The notification "Ordering data saved successfully" appears
<b>Post Condition</b>	"Successfully Added"
<b>Status (Pass/Fail)</b>	PASS



On the page manager, there is a process where the manager approves the order to be submitted. After approval by the Manager, the order will be sent to the production planning department to make a production schedule that will be sent to each section of production, and each time the production will give a production status (see Table 9). After the production is complete, there will be checking of orders made by the QC department so that each product is guaranteed quality. Questions will be discussed with the production manager.

Tabel 9 Test case scenario function confirmation order

<b>Use Case ID</b>	PO002
<b>Use Case Name</b>	Confirmation Order
<b>Test Scenario</b>	Test cases using order confirmations on functions that approve the order
<b>Test Case</b>	perform confirmation use case testing on the order approve function
<b>Pre-Condition</b>	The order has not been approved
<b>Test Steps</b>	1. Click icon order 2. Click "Button Verification"
<b>Expected Result</b>	The notification "Data successfully saved" appears
<b>Post Condition</b>	"Successfully Added"
<b>Status (Pass/Fail)</b>	PASS



Each user is given a username and password to access this system on the user management page. The admin can add users, delete users, and view users.

### 3.2. The Acceptance Test

Testing user acceptance in this study was conducted by testing 31 test codes for 5 types of users, namely the marketing section, planning section, production section, warehouse section, production manager. The results of the application of user acceptance testing are seen in table 10.

Table 10. UAT results

No	User/Tester	Acceptance Rate	Notable comments
1.	Marketing	(25 out of 31) 80,15%	"A pretty good system makes it easy to receive orders from customers"
2.	Planning Section	(22 out of 31) 80.25%	"quite good" "Maybe it would be better if the date passed could not be clicked"
3.	Production Section	(20 out of 31) 82,76%	"Enough detail to see the production process"
4.	Warehouse Section	(21 out of 31) 78.72%	"maybe it's better when you haven't added material data yet, the style doesn't appear first " "Better in the image style, not too big"
5.	Production manager	(24 out of 31) 82.76%	"It's good in providing data information" "It's better to check by the same date"
<b>Average Acceptance</b>		<b>80,98%</b>	

Based on table 10, the acceptance test results obtained produced some of the highest percentage acceptance rates, namely in the division of production and production managers by 82.76%, from these results, indicate that the two divisions were greatly helped by the monitoring of production systems, although some minor problems occurred during system testing, which is very normal in most cases of implementation.

### 4. Conclusions

Based on the purpose of this research, the system has been able to assist in the process of monitoring the production process. So that the product manufacturing process can be done as it should and produce solid products that achieve the targets that must be achieved. Based on table 10, the user acceptance test results obtained produced some percentage of the 80.89% acceptance rate, with the highest acceptance rate from the production department and the



production manager of 82.76%, from these results, showing that the two divisions were greatly assisted by the monitoring system. This study will be further developed in more accurate scheduling calculations, customer complaints features and payment features.

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