

# Implementation of Digitalization of Daily Production Report in Manufacturing Industry to Improve Data Efficiency and Accuracy

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## ABSTRACT

The development of science and technology is increasingly rapid, including in the industrial world of production and manufacturing, technology is increasingly used in improving company performance. The manufacturing industry, including the Fast-Moving Consumer Goods (FMCG) sector, continues to strive to improve operational efficiency and productivity. Digitalization has become key in this effort. Through the integration of digital technology, companies can automate their production processes, improve visibility over operational performance, and make informed decisions. Before digitalization, daily reporting often involved manual data collection from various sources, such as production machines, Operators, and physical work daily sheets. This could lead to errors in data entry, delays in processing and difficulty in interlinking data from different systems. This digitization training aims to increase operational efficiency, improve data accuracy, and increase the accessibility of production information, such as knowing the process or flow in making daily reports to visualizing production data so that it makes it easier for the Operations Team and Management to monitor factory productivity.

**Keywords:** Automation Digitalization, Manufacturing Industry, Productivity Efficiency, Information Technology

## INTRODUCTION

The industrial revolution 4.0 is a digital era when all machines are connected through an internet system or cyber system characterized by increasing connectivity of interactions and boundaries between humans, machines, and other resources that are increasingly convergent through information and communication technology. Indonesia has committed to building a globally competitive manufacturing industry through the accelerated implementation of industry 4.0. This is marked by the launch of Making Indonesia 4.0 as a road map and strategy for Indonesia to enter the digital era that is currently running. [1]

In the era of rapidly growing digitalization, digital implementation is a must for manufacturing companies to improve their operational efficiency and competitiveness, but in addition to having an impact on efficiency and productivity, the use of digital applications also has the potential to affect employee motivation and job satisfaction [2].

The manufacturing industry is constantly striving to improve operational efficiency and productivity. Digitalization has become a key factor in this effort, through the integration of digital technology, companies can automate their production processes, improve visibility over operational performance, and make faster and more informed decisions.

This research aims to identify the obstacles that arise in the process of manually generating daily production reports in the manufacturing industry, and develop digitalization solutions to overcome these problems. The main objective of this research is to improve operational efficiency, data accuracy, and accessibility of relevant information, thus supporting faster and more precise decision-making. The implementation of digitization is expected to replace manual methods that are prone to human error, increase productivity, and reduce waste of time and costs.

## RESEARCH METHODOLOGY

The method used in this research is qualitative and case study by conducting interviews directly with operators, Production Supervisors, and management with the aim of digging in-depth information about the process of making production reports. Observation is also carried out in the field to understand the process of making production reports and find obstacles. As well as studying the documents used for writing production reports.

Preparation of daily production reports in the manufacturing industry is written manually using paper by the operator and inputted into the database by the Admin. This condition of course has several obstacles such as requiring paper, requiring a lot of time, energy and potential errors when inputted by the admin to the database due to the unclear writing of the operator making it difficult for the admin to read the report, etc.

In order to minimize this condition, the manufacturing industry changed the method of making daily production reports from manual to digital, namely using applications with tab facilities. By paying attention to this background, this digitalization implementation is expected to increase the efficiency and accuracy of data in the manufacturing industry.

## RESULT AND DISCUSSION

### Problem Identification

A daily production report is documentation that records production activities and results on each working day in a company. The main purpose of the daily production report is to provide a clear picture of the production performance on that day, as well as identify problems that arise during the production process. problems that arise during the production process.

The production report contains several things, namely: production data, production efficiency, production problems, production quality, machinery and equipment conditions and labor. Given the importance of daily production reports, the ease of access in filling, analyzing results and monitoring must be done easily and quickly.

Daily production report generation in the manufacturing industry is written manually using paper by the operator and inputted into the database by the admin. In order to minimize this condition, it was decided to change the method of making daily reports from paper or manual to digital using applications with tab facilities.

The following is the condition of the process flow when the daily production report is still done manually:



Figure 1 Daily Production Report Creation

From the above conditions, there are several obstacles in the process flow of making daily production reports, including:

1. Operator writing is sometimes difficult to read
2. Constraints on the availability of work stationery (ATK)
3. Operator discipline in completing all report filling variables
4. Damaged or lost report paper
5. The results of the production report are not real time because they are inputted by the admin on the next work shift.
6. Input errors made by the production admin
7. It is difficult to integrate production reports with other reports because it has not used web based.
8. Microsoft Excel's limitation to process data in a large capacity.

Taking into account this background, after the implementation of this digitalization, it is expected to increase the efficiency and accuracy of data in the manufacturing industry.

In the manual process of making daily production reports in the manufacturing industry, there are various obstacles that affect efficiency and accuracy. These constraints include operator writing that is difficult to read, limited stationery, and processes that are not real-time because new data is inputted on the next work shift. In addition, data integration with other systems is difficult, and the use of Microsoft Excel has limitations in handling large-capacity data.

To systematically identify and visualize the root causes of these constraints, a fishbone diagram is used. This diagram provides an overview of the relationship between the main problem and the causal factors from various aspects, such as people, methods, materials, equipment, work environment, and data management.

The following is a fishbone diagram that illustrates the various causes of obstacles in making daily production reports in manual:

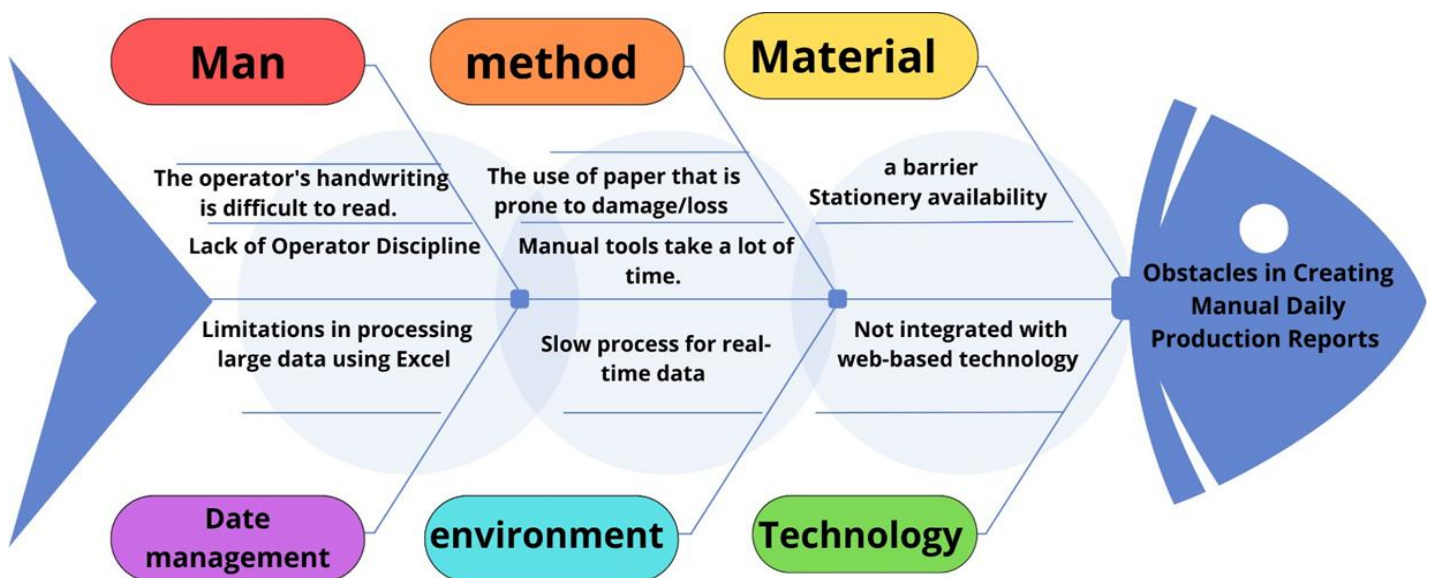


Figure 2 Fishbone Diagram

### Data and Material Collection

In the previous condition, the daily production report was written using paper by the operator and submitted to the Shift Team Leader to be validated, then the report was processed by the Data Analyst to get conclusions or insights from the report written by the Operator regarding the productivity of all machines and also from other related departments, such as Engineering, Logistics, Mixing, Quality, Utility, etc.

The contents of the daily production report written by the operator include: Date, Operator's name, Team Leader's name, what shift, line name, product name produced, total output, problems that occurred during one shift, etc. The following is the front view of the manual daily production report can be seen in the picture below:

		Laporan Produksi Harian Line : SACHET 5.4																TOTAL		Deskripsi problem	Pointra	NO POK / PK
Hari, Tanggal, Dinas : Kamis, 02 Juni 2022 DM		22/06/14	23/07/16	24/08/18	01/09/17	02/10/19	03/11/19	04/12/20	05/13/21	MS	SD											
M. (Buat Down (3'15'') + R. (Miner Stagg) (4'15''))	Uraian	1.1 Real Feed Adjustment																				
	Filling	1.2 Uraian Roll / Motor																				
		2.1 Main Drive																				
		2.2 Nozzle																				
	Sealing	2.3 Rotary Filling																				
		2.3 Control System / Hopper																				
		3.1 Vertical Seal / Temperatur																				
		3.2 Seal Jaw / Heater																				
		3.3 Rubber Roll / Pulling																				
		3.4 Round Knife																				
3.5 Emboss Coding																						
3.6 Horizontal Seal / Temperatur																						
3.7 Perforate / Cutting / Easy Tearing																						
AUTO CASE PACKER	3.8 Protocol																					
	3.9 Control System																					
	4.1 Control System																					
	4.2 Conveyor Infeed / Outfeed																					
LANTECH CASE CLOSER	4.3 Collector / Central Drop																					
	4.4 Droplice																					
	5.1 Infeed belt/Closer flap																					
CASE ERECTOR	5.2 Stopper / Pusher locate																					
	5.3 System control																					
	5.1 Carton magazine/pressure plate																					
Other	5.2 Pusher / flap folder																					
	5.3 Hot Melt / System Control																					
	7.1 Fibre Coding																					
	7.2 Roller Conveyor Product																					
	7.3 Conveyor Spiral																					

Team Produksi				Nominal Speed :	Aktual Speed :	Produksi Sesuai Mapping WPP			Dibuat (Operator)	Diperiksa (TL)
Details	NIP	Nama	Jam Kerja	postment	LLS	SRV / PC (B Digit)	Target Output	Aktual Output		
Team Leader		Rudi Mulyadi	376150							
Operator		Li Sam D	463087							
Operator		Sandra Hartama	376541							
Operator										
Operator										
Operator										
Tiger										

Figure 3 Daily Report Form Front view

		Laporan Produksi Harian Line : SACHET 5.4																TOTAL		Deskripsi problem
STOP DESCRIPTION		22/06/14	23/07/15	24/08/16	01/09/17	02/10/18	03/11/19	04/12/20	05/13/21											
Idle Time (Target / Impact Manuver / No Production Order)		30	60	90	120	150	180	210	240	270	300	330	360	390	420	450	480			
Legal Losses	A. External/Legal Loss	A1 Perawatan Legal																		
	B. Bank holiday	B1 Libur Tanggal Merah (kecuali hari Minggu)																		
	C. Shift pattern	C1 Minggu Libur																		
Unused Capacity Losses	E. Planned stoppage time	E1. Evacuation Drill Terencana E2. Factory Meeting / Safety Campaign E3. Planned System / SAP Downtime E4. Planned Training E5. Safety Briefing E6. Sholat Jumat																Hanya Untuk Planned SAP OFF		
	F. Shortage of utility (Force majeure)	F1. Bencana Alam / Demo F2. Electrical Shortage (CL/PLN) F3. Water Shortage from Industrial Estate																		
	G. Equipment / Process trial & Scheduled Modification time	G1. Planned Trial Development G2. Planned Trial Engineering G3. Planned Trial Project G4. Planned Trial Quality																		
	H. Maintenance time	H1. Penggantian Strainer H2. PM di luar rencana H3. PM terencana I. Meal / Tea break																- conveyor transfer error (inve man) - sacht nyangkut H-seal - sacht alarm error (supply air compressor kurang) - setting code fib		
	J. Cleaning and sanitation time	J1. Cleaning Strainer J2. Sanitasi Rutin J3. Start Up Cleaning dan Sanitasi Awal Minggu J4. Kebersihan Mesin J5. Pembersihan Rutin																		
	K. Change over time	K1. Bongkar Pasang Part K2. CIP K3. Cleaning Strainer K4. Warm Up / Setting & Adjustment																		
Manufacturing Performance Losses	L. Preparatory & close out time (start up/rampdown)	L1. Start Up Setelah Sholat Jumat L2. Start Up Awal Week / Ramp Down Akhir Week																60' start CIP (conveyor man line man)		
	N. Process failure time	N1. Failure Inhouse Utility (Compressor, Electrical, & Boiler) N2. Failure on Processing Equipment N3. Main Line Conveyor ke Palletan Macot N4. Tidak Ada Suplai Listrik / Udara Bertekanan di Mesin N5. Tunggu Air Panas N6. Valve CIP																		
	O. Shortage of opr	O1. Operator Terlambat Masuk O2. Operator Sakit																		
	P. Material availability at line side loss (Logistic loss)	P1. Tidak Ada PM P2. Tidak Ada 2nd PM P3. Warehouse Clogging/Penuh/Storage Pallet/Tidak Ada Truck Q3. Ganti Code / Batch																		
	Q. CUTTING BLADE CHANGE *existing routine activity	Q4. Ganti Barrier Q5. Ganti Easy Tearing Knife Q8. Ganti Reel Feed (Damar) Q10. Ganti Tinta Coding Fib																		
	T. Quality defect time loss	T1. Masalah Quality Product U4. Filling Unit																		
	U. Measurement & Adjustment	U9. Reel Feeder Machine U10. Sealing Horizontal U11. Sealing Vertikal																		

Figure 4 Daily Report Form Back View

The following is a dashboard design that is made as a material for analyzing productivity using excel, can be

seen in the picture



Figure 5 OEE Dashboard Using Excel

The dashboard above shows the monthly trend of monthly Overall Equipment Effectiveness (OEE) values, machine utilization capacity and also the Pareto Loss Tree.

### Implementation of Digitalization Implementation

After making improvements in the form of digitization for daily production reports, this is the application used for inputting production data:

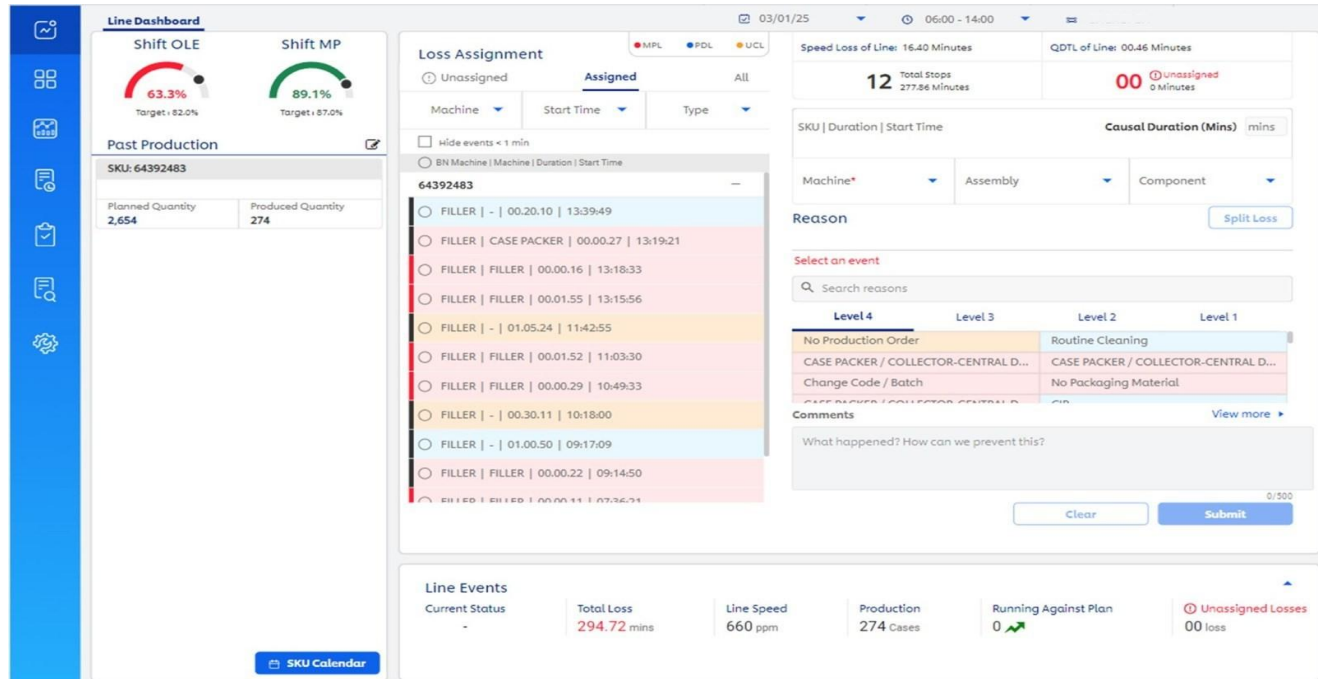


Figure 6 App View

The contents of the Application include:

1. Line Name
2. Region and Factory Name
3. Achievement of OEE Value

4. Product Variant being manufactured
5. Date and Shift
6. Loss Time Allocation
7. Recording of Machine Run and Stop activities
8. Actual machine speed
9. Production Output

The way this application works is to record run and stop activities on the machine in real time using a relay mounted on the machine panel and connected to the Filling machine sensor as a Bottle neck, the relay captures the run and stop signal from the filling sensor and will send a signal to the radio installed on the panel, and the radio will send a gateway signal for further translation from machine language to human language by the interpreter before being transferred to the Check Stage server (Check) stored to the database.

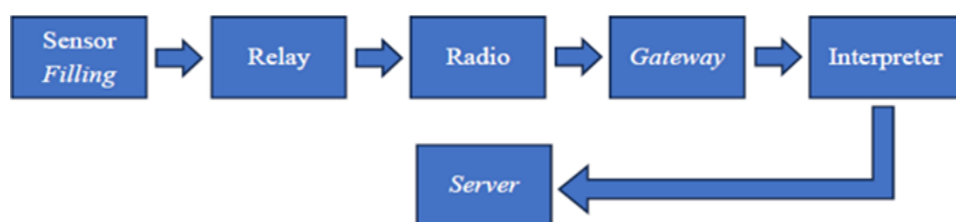


Figure 7 Data Processing Flow from Sensor to Server

From the database, it will be connected to the Microsoft Power BI application for further processing and packaging of the data in an online dashboard as needed, including monitoring productivity, Progress Improvement to reduce lost time, Performance of departments directly related to production activities such as Logistics, Quality, Engineering, etc. And of course, this dashboard is used by management to make decisions related to productivity.

The following is a dashboard display as a medium for analyzing and monitoring Productivity using power BI where the data on this dashboard will be refreshed automatically for 8 times in 1 day.

### OEE Report

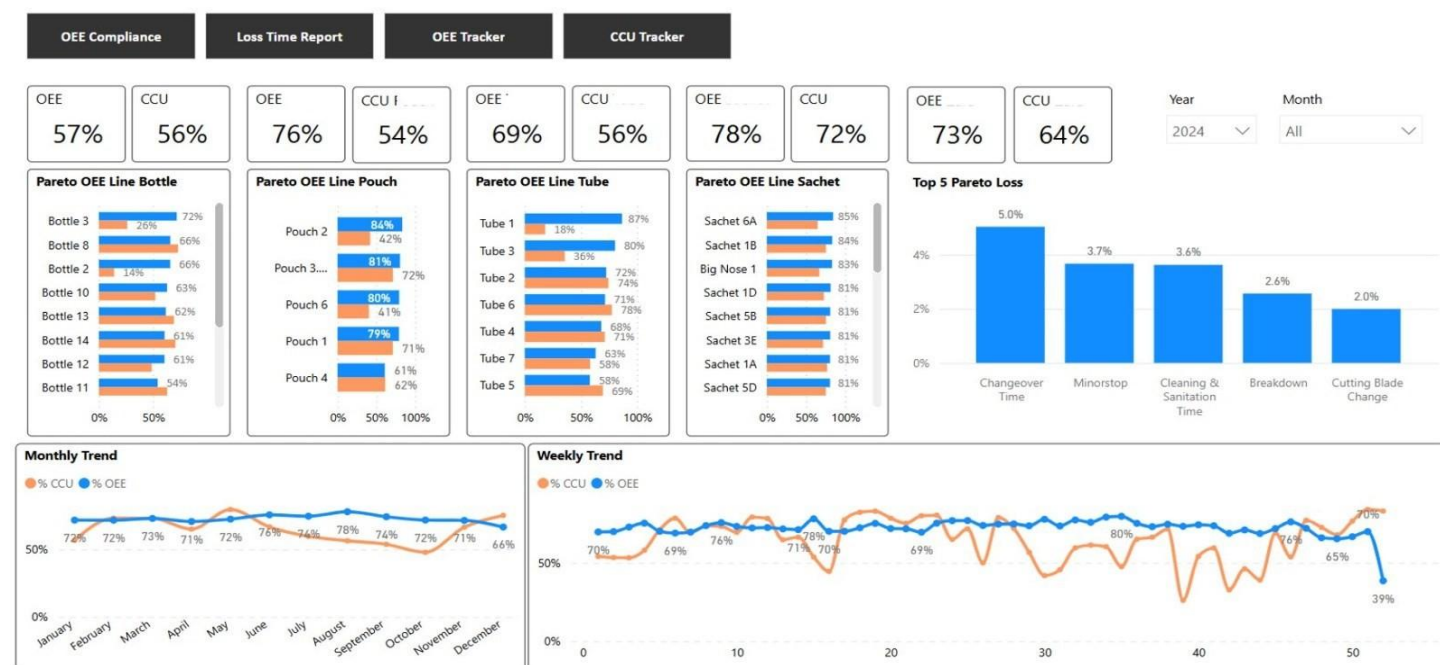


Figure 7 Online dashboard using power BI

The dashboard above contains OEE values for each line and overall OEE, OEE trends for each week and month, capacity, and pareto loss tree.

The following are some of the benefits after the implementation of digitalization of production reports daily production report:

1. Improved operational efficiency; digitizing production reports allows for a faster and more efficient reporting process. By using a digital system, the time required to compile, collect, and analyze production data can be minimized, thereby speeding up decision-making and response to changing production conditions.
2. Improved data accuracy: digital reporting systems have tighter controls against human error and reduce the risk of data entry errors. This results in more accurate and reliable data, which assists management in making better and informed decisions.
3. Better accessibility: with production reports available digitally, information can be accessed from anywhere at any time using internet-connected devices. This facilitates collaboration between teams, allowing management and related parties to monitor production more easily.
4. More effective performance monitoring: digital reporting systems are equipped with performance monitoring features that allow management to track production performance in detail. By analyzing historical data and production trends, companies can identify patterns, problems, or opportunities that can be corrected or leveraged to improve efficiency and productivity.
5. Cost savings: Although it requires an initial investment in the development and implementation of a digital system, in the long run, digitizing production reports can result in cost savings. This is mainly due to improved operational efficiency, reduced human error, and reduced administrative costs associated with physical document management.
6. Increased compliance and auditability: digital reporting systems can facilitate compliance with applicable regulations and industry standards. Data stored in digital format is easier to audit and maintain, thus meeting stringent audit and regulatory requirements.

## CONCLUSIONS

After the implementation of digitalization, the daily production report generation in the FMCG industry is no longer done manually, but digitally using tabs. And from this implementation, several major benefits were obtained, including: increased operational efficiency, increased data accuracy, easier accessibility, more effective performance monitoring, and cost savings.

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