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Improving Perfect Order Fulfillment in Textile SMEs with Open-Source ERP Odoo Implementation Based on the SCOR Model

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ABSTRACT

SMEs often struggle with manufacturing efficiency and inventory management, hindering their ability to meet customer demands. ERP systems can integrate data to improve planning and decision-making but must align with SCOR principles to ensure holistic digital transformation. This study examines CV. PJ, a textile SME in Bandung operating across three locations to process yarn into raw material and then into dyed fabric. Problem identification was carried out using qualitative methods employing surveys and interviews and also quantitative methods to analyze sales data. A gap analysis revealed two primary issues that include plan and make. The plan component aims to enhance customer fulfillment planning accuracy through demand forecasting, while the make component focuses on production efficiency. To address these issues, the open-source ERP system Odoo, with modules for finance, manufacturing, inventory, sales, and purchasing, was implemented to streamline six main processes. The system effectively recorded data and generated reports, enabling SCOR-aligned decision-making. After six months, the implementation achieved an average perfect order fulfilment rate of 87.5%, categorized as excellent. This study highlights how SCOR-based ERP Odoo implementation enhances scheduling and product movement efficiency, significantly improving operational reliability and customer satisfaction.

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INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are a vital pillar of Indonesia's economy, significantly contributing to job creation and economic value. According to data from the Ministry of Cooperatives and SMEs, Indonesia had over 103,1 million MSMEs in 2023, accounting for approximately 61% of the Gross Domestic Product (GDP). Globalization, which has intensified business competition, demands that MSMEs continuously improve operational efficiency. Operational efficiency is crucial for companies to achieve optimal results, even with limited resources.

Suharman explains that the Fourth Industrial Revolution (IR 4.0) empowers the role of digitalization in manufacturing and supply chain networks, involving the integration of digital information from various sources and locations to drive physical manufacturing and distribution. The end-to-end digital integration offers an information technology platform across every value chain stage, from product development to manufacturing, engineering, production, and services [1]. This highlights the importance of leveraging information technology for MSMEs to support data-driven planning and decision-making.

Without the ability to adapt to technological advancements and effective business processes, companies will struggle to manage data, plan, and evaluate performance effectively [2]. Consequently, MSMEs may fail to compete with other businesses in both domestic and international markets.

The textile sector is one of the most significant MSME sectors contributing to the national economy, especially in West Java. However, its economic contribution remains suboptimal, with generally low order fulfillment rates. According to the Ministry of Industry, the production value of Indonesia’s textile and textile products (TPT) industry began to recover in 2023, partly due to laws protecting TPT imports. Nevertheless, the production value of this industry remains far lower than that of other leading textile-producing countries. Data from United Nations Comrade shows that Indonesia ranks 14th in terms of export value to other countries, as illustrated in Figure 1.

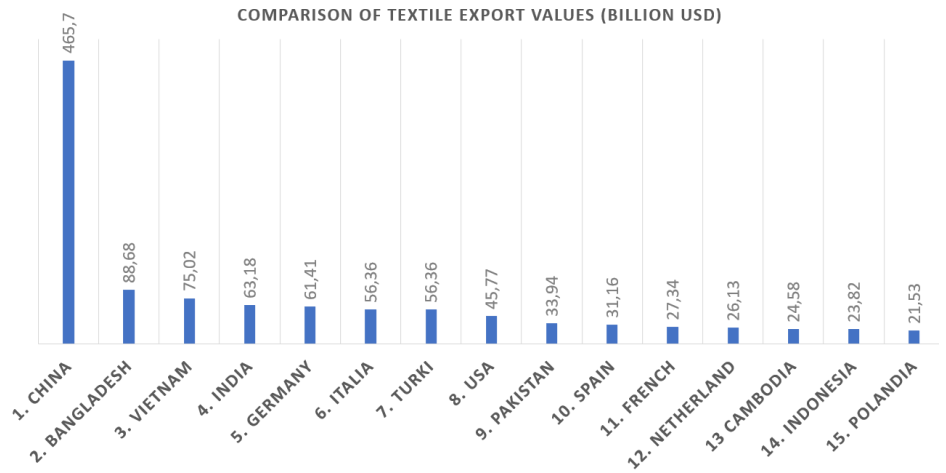

Figure 1. Comparison of Textile Export Values in the World

Yuliawati in the previous research for textile industry stated that many MSMEs in this sector face challenges in managing supply chains and inventory, such as imbalances between raw material inventory and production demand [3]. These inefficiencies often lead to two major issues, which are excess raw materials that increase storage costs or raw material shortages that hinder production. Consequently, customer orders cannot be fulfilled on time, affecting reliability and overall customer satisfaction.

CV. PJ, a textile MSME in Bandung, also faces challenges in achieving process efficiency and inventory management. Interviews with management revealed that delays in order fulfillment are a major issue. Operational data from 2020 to 2024 shows that the average perfect order fulfillment (POF) rate reached only 73%, categorized as average. After conducting further observation, it is known that the problem happened primarily due to the lack of integrated supply chain management, including inadequate demand forecasting and procurement planning.

The lack of visibility and coordination in Supply Chain Management (SCM) disrupts order fulfillment, negatively impacting operational efficiency and customer satisfaction. To address these challenges, this study applies the SCOR framework, specifically focusing on improving the reliability performance attribute through POF as the key metric. By implementing an ERP system aligned with SCOR, we aim to enhance scheduling accuracy, inventory control, and end-to-end supply chain coordination, ultimately leading to a higher POF rate [4].

An effective approach to managing SCM is the use of the Supply Chain Operations Reference (SCOR) model [5]. SCOR provides a standardized framework for measuring and improving supply chain performance through its components: planning (plan), sourcing (source), production (make), delivery (deliver), and returns (return). By adopting SCOR principles, companies can have a systematic guide to identifying raw material needs, planning production, and optimizing inventory processes.

American Production and Inventory Control Society (APICS) that now known as Association for Supply Chain Management (ASCM) introduce SCOR model, to helps companies standardize processes, conduct analysis, and improve supply chain operations. The model outlines how companies manage their supply chain processes and analyse these processes, enabling improvements based on best practices [6]. The SCOR model is also highly flexible, allowing users to apply the framework regardless of their business scale or processes, ensuring its applicability as the company evolves [7].

In the SCOR framework, data availability is critical. It offers new perspectives for identifying issues that were previously unnoticed or overlooked [8]. Accurate data is essential for calculating metrics, which are ultimately used to measure the gap between a company's performance and its expectations. Process flow management also requires accurate information. Inaccurate inventory data can cause difficulties in determining raw material needs and scheduling production, leading to delays in order fulfilment [9]. Manual data recording using paper and Excel exacerbates the situation, as employees often lose physical records, and Excel data cannot be easily distributed. As a result, companies lack accurate guidance for planning raw material needs and production. It can be concluded

that the current manual recording system is insufficient to meet increasingly complex operational demands.

To support more structured and accurate data recording, implementing an Enterprise Resource Planning (ERP) system is essential. ERP systems are complex solutions that integrate various business processes and related information within an organization [10]. This integration includes core business processes such as procurement, inventory management, production, sales, and customer service in a single system. With integrated processes, ERP systems store data and share accurate, real-time information across departments [11]. Research by O. Alaskari et al. indicates that ERP adoption among SMEs enhances operational efficiency and reduces data errors [12]. Consolidating all information within one system encourages cross-departmental collaboration, improving efficiency, accuracy, and data-driven decision-making [13].

However, most system implementations primarily focus on IT methodologies, such as Fadhil's research using waterfall methodology emphasizing data integration and automation without incorporating supply chain-specific frameworks [14]. Arvianto in the previous research used re-engineering business process methods to match the business process into ERP feature [15]. Meanwhile, Vadysa used quick start method whereby the focus is to provide flexibility in system development [16]. Affandy adopted the Accelerated SAP (ASAP) method that is usually used to implement SAP, the largest ERP software, whereby the focus is to improve efficiency in the project implementation of Odoo ERP [17].

These approached limit their ability to provide actionable analytics tailored to supply chain performance, which is critical for industries like textiles. Without a structured framework such as SCOR, ERP systems often fail to address the root causes of supply chain inefficiencies, such as imbalances in inventory and production demands.

ERP systems are generally categorized into two types: licensed (commercial) and open-source. Commercial ERP systems often require significant investment, and many detailed configurations are unnecessary for small-scale businesses. This makes open-source ERP systems a suitable solution for SMEs [18]. One example is Odoo, an open-source ERP system with comprehensive and easily configurable modules tailored to business needs. Additionally, Odoo does not require licensing fees, which can reduce the financial burden on companies [19].

Himawan, in previous research, successfully implemented the Odoo ERP system for a textile company that outsourced the dyeing process of raw fabric to partner companies [20]. In this study, the fabric dyeing process will be carried out internally by CV. PJ, making the business process more complex than in the previous study. Additionally, CV. PJ operates across three locations, each dedicated to a specific production process. The integration of fabric movement is a critical aspect for ensuring that materials are at the right location at the right time.

Given the company's complex production chain, ERP implementation must be guided by SCOR analysis to improve business process efficiency. The SCOR framework provides a standardized approach to supply chain management, enabling companies to measure, analyse, and optimize performance through key components like planning, sourcing, production, delivery, and returns. By integrating SCOR principles into ERP systems, this study introduces a novel

approach that bridges the gap between IT-centric ERP implementations and supply chain management needs.

Unlike traditional ERP systems that focus solely on data automation and integration, SCOR-guided ERP implementation enables companies to identify and address inefficiencies using supply chain performance metrics. This integration ensures that ERP systems are not only tools for digitalization but also enablers of supply chain optimization. The ability to align ERP functionality with SCOR principles represents a paradigm shift in how MSMEs can leverage technology to enhance operational efficiency and customer satisfaction.

This study is crucial for Indonesian MSMEs, as most are still operating conventionally, facing limitations in supply chain management, distribution, and order fulfilment. Integrating ERP-based information technology with the SCOR framework provides a practical solution for optimizing workflows, enhancing customer satisfaction, and accelerating digital transformation as mandated by the National Industrial Development Plan (RIPIN) 2020–2045.

This integration represents a shift in how MSMEs can leverage ERP systems—not just as tools for digitalization but as enablers of supply chain optimization. By aligning ERP implementation with SCOR principles, this study offers a scalable and practical model for improving operational efficiency and competitiveness in resource-constrained MSMEs. The case study on CV. PJ demonstrates how SCOR-based ERP can address complex supply chain challenges, serving as a guide for other MSMEs seeking to enhance their supply chain performance and overall competitiveness.

RESEARCH METHOD

This study offers a unique contribution by integrating the SCOR framework into the implementation of Odoo ERP to enhance the efficiency of order fulfilment processes, a topic that has not been extensively explored in previous research. While earlier studies generally focused on either ERP adoption in general or SCOR analysis as a tool for evaluating supply chain performance, this research combines both approaches in the context of Indonesian MSMEs.

This approach not only provides specific technical guidelines for implementing a SCOR-based ERP system but also presents a practical model that can be replicated by other MSMEs facing similar challenges. Thus, this study highlights its novelty by combining two complementary concepts into a single integrated solution. The methodology used in this study adopts the SCOR implementation stages as defined in SCOR 12 documentation [5]. Additionally, the ERP Odoo implementation stages are incorporated into this framework. The complete five stages were carried out, as shown in Figure 2.

The first stage is the pre-SCOR program steps, which define the organizational structure and stakeholders involved in the company. This step is essential for understanding decision-making processes, which influence the company's planning and scheduling processes. A clear organizational structure supports the success of SCOR and ERP implementation, as both require task distribution and authority in business processes. Furthermore, this stage includes in-depth interviews and process observations to identify the main issues motivating the process improvement implementation.

To complement the findings from interviews and observations, sales and delivery data from January 2021 to December 2023 were collected. However, since data recording is currently separated across divisions using Excel sheets, some data is incomplete. A data-cleaning phase was conducted by selecting sales data that was complete, covering the entire process from ordering to distribution.

The second stage involves the setup of the SCOR scope, starting with mapping the company's business process flow. This mapping determines whether the company has a structured and well-documented process flow [21]. Standardization and correct process sequences are necessary to ensure employees can carry out tasks clearly.

Process flow mapping also helps the company define the flow of information and products within the organization. This aligns with SCOR principles, where an effective supply chain flow must illustrate the exchange of information and products between internal and external stakeholders. By understanding this flow, the company can identify priority processes within SCOR that represent the main issues in the organization.

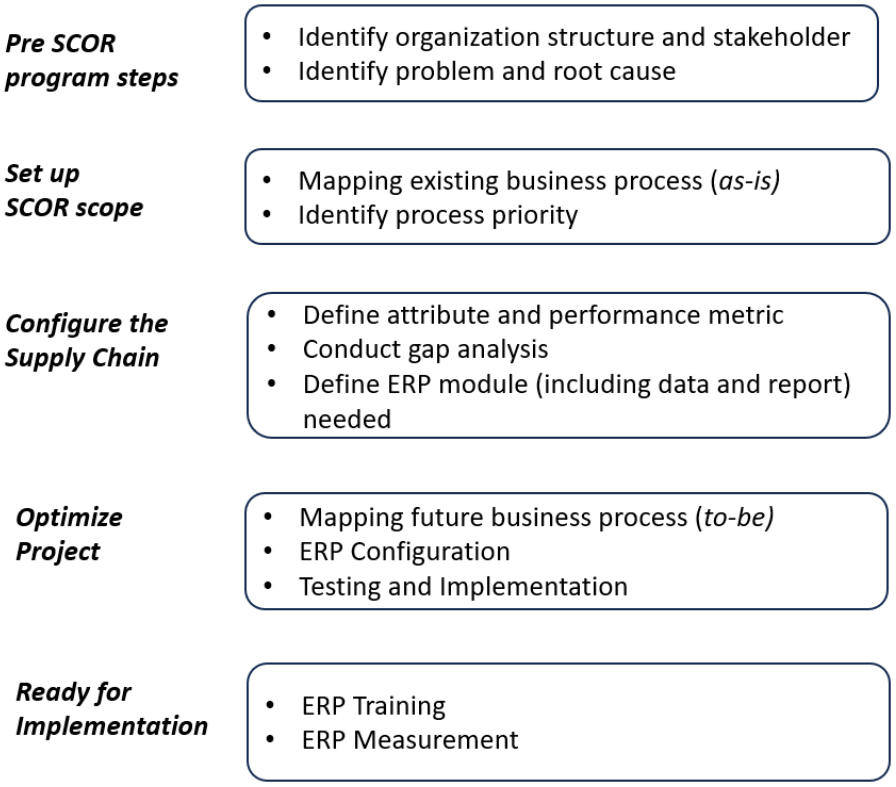

Figure 2. Research Methodology

After determining the SCOR priority processes that are problematic, the third stage, supply chain configuration, begins. This stage involves defining performance attributes and metrics for the company. A gap analysis is conducted to compare the current state (as-is) of the company's processes with the ideal state based on SCOR performance attributes. The identified performance attributes then form the basis for determining the required data. This data is linked to the ERP system modules.

Additionally, performance metrics guide the necessary reports the ERP system must generate. This step is essential to ensure the ERP configuration aligns with the core requirements of SCOR processes. The next stage, project optimization, allows the company to define an ideal process flow (to-be) based on SCOR standards.

This new process flow becomes the reference for configuring the Odoo ERP system. This also will ensure that the Odoo ERP system configuration improves process efficiency, not just automates existing workflows. At the end of this stage, testing is conducted to verify whether all required business processes are included in the Odoo ERP system. Testing ensures the ERP implementation aligns with the data and metrics defined during the SCOR process.

The final stage, ready for implementation, includes introducing and training employees on the new processes and system. This step is critical for increasing employee awareness and familiarizing them with the workflows in the Odoo ERP system. The success of SCOR implementation is also supported by effective ERP system training.

To evaluate the success of SCOR implementation, reports will be generated from the Odoo ERP system based on the metrics defined in the third stage. These reports will indicate whether the company's process flow has improved in efficiency, particularly in achieving perfect order fulfilment. Perfect order fulfilment will be measured using the formula in Equation 1.

$$perfect\ order\ fulfilment = \frac{\sum \text{perfect order}}{\sum total\ order} \times 100\% \quad (1)$$

As showing in the equation 1, perfect order fulfilment will be calculated from the ratio of perfect order and total order. The perfect order means that the company is able to fulfill the whole quantity requested by customer, while the imperfect order means that the company cannot deliver the quantity ordered.

RESULT AND DISCUSSION

The ERP implementation process follows the research steps outlined in the SCOR framework. The first step involves identifying problems through interviews with management, including the company director, the head of finished fabric production, the head of raw fabric production, and the warehouse manager.

The interview results are validated using data analysis. This analysis incorporates order fulfilment data from the past three years, including the number of orders received, the number of orders fulfilled on time, and the production cycle time for each order. The findings revealed that on-time performance only reached 75%, significantly below the company's target of 98%, indicating a substantial gap in order fulfilment performance.

The root cause analysis identified that production delays were primarily caused by raw material shortages. Production records from the past two years show that approximately 30% of total production delays resulted from insufficient availability of raw materials, particularly the raw fabric required in the initial production stages. Further analysis of raw material usage data revealed that 25% of the raw fabric was often allocated to later-arriving orders, delaying production of earlier orders.

Additionally, raw fabrics that had undergone initial processing were frequently not

prioritized correctly during the dyeing stage, leading to fabric accumulation in production areas. This builds up caused the fabrics to become dirty or damaged, requiring additional cleaning or smoothing before reuse. Data also indicates that 15% of total materials experienced damage or quality degradation due to disorganized accumulation, resulting in increased production costs and reduced overall process efficiency.

Business process flow mapping was conducted to outline the flow processes both for information and the goods, as shown in Figure 3. The dashed line shows the information flow, while the solid line shows the goods movement. Black colour line indicates the flow between company and vendor, while the purple colour shows the interaction between company and the sub-contractor vendor. Blue colour line indicates the flow between each production location, while the yellow colour shows the interaction between company and the customers. The process begins with thread purchase, which is woven into raw fabric at the RJ location. The raw fabric is then sent to the LW location for further processing based on customer requirements. Customers provide specific details with their orders, such as whether the fabric needs smoothing or a particular texture. The raw fabric is processed accordingly, followed by dyeing and design printing. The finished fabric is then sent to the BE location for packaging and delivery to the customer.

The process flow mapping revealed issues with raw fabric unavailability during the dyeing stage. Problems occurred at the RJ location, responsible for raw fabric production, and the LW location, where finished fabric is produced. These issues stemmed from a lack of information flow, as the BE location, where customer orders are created, did not provide order priority information to RJ and LW. Consequently, there was no effective production planning or scheduling, leading to disrupted material flow. The problem is shown by blue highlight in the Figure 3.

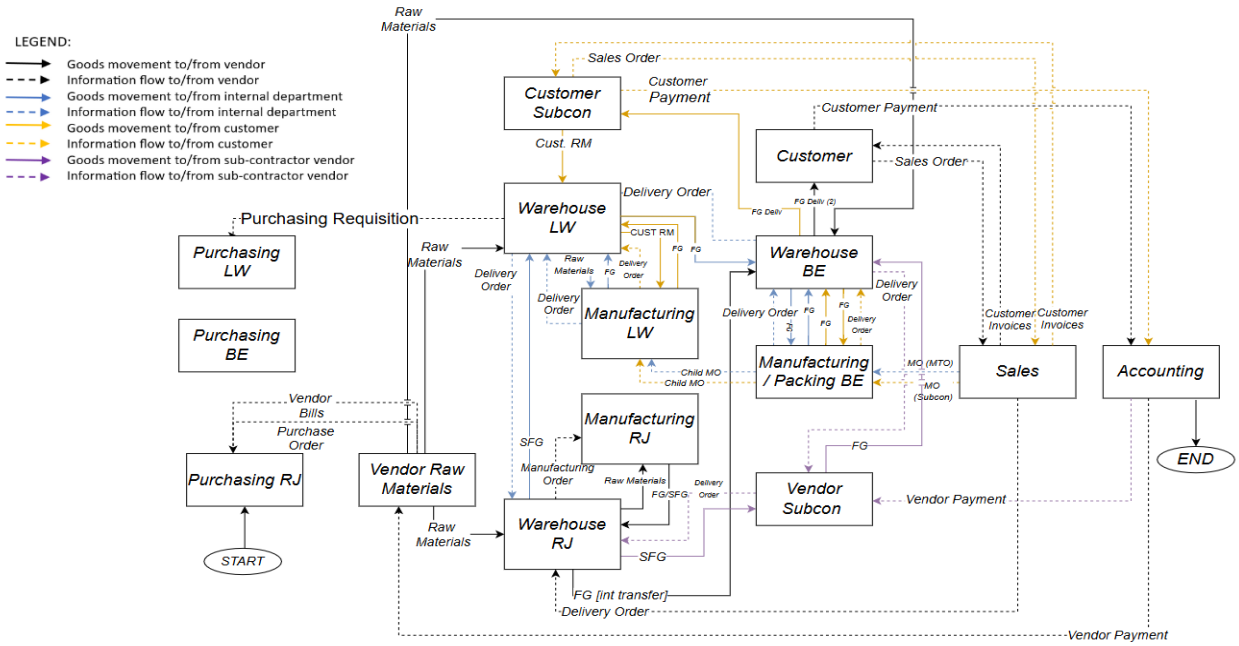

Figure 3. Flow of information and goods processes

Based on the identified issues, the relevant SCOR components for this process are Plan and Make, as the primary problems lie in unstructured production planning and suboptimal raw material management. For the Plan component, improvements focus on developing a more effective planning system to manage production schedules and allocate raw materials based on order priorities. The goal is to ensure that the production sequence aligns with order dates and customer requirements, avoiding the use of raw materials for later-arriving orders at the expense of earlier ones.

Meanwhile, in the make component, improvements will focus on better production management, including production scheduling, capacity management, and quality monitoring. With more structured production management, the company can reduce material piles in the production area, avoid fabric damage due to process delays, and optimize the use of machines and labour. This approach is expected to improve production flow, reduce waiting times between processes, and ultimately increase production accuracy.

Thus, six detailed processes have been identified as priorities for improvement at CV PJ. The results of the priority process mapping, along with their attributes and measurement metrics, are shown in Figure 4, followed by a gap analysis. This phase is used to determine whether the company's current business processes have the detailed processes defined in the SCOR components. The gap analysis will also assess the company's current performance on the detailed business processes. The results of the gap analysis can be seen in Figure 4.

The process gaps identified in the SCOR analysis—such as inaccurate forecasting, manual scheduling, slow cost calculation, and poor inventory management—directly impacted POF by causing delays, incorrect orders, and higher costs. Inaccurate forecasting led to overstock or understock, reducing the ability to meet customer demand on time. Manual scheduling resulted in production misalignment with customer orders, causing delays and late deliveries. Slow cost calculation increased operational inefficiencies and made it difficult to set accurate pricing, while poor inventory management resulted in stock imbalances, contributing to missed or incorrect orders. These issues collectively reduced order accuracy and delivery efficiency, leading to a lower POF score.

By applying the SCOR framework, companies can systematically identify the key performance metrics required to evaluate their supply chain efficiency. In this study, SCOR performance calculations revealed that 11 metrics could be supported by Odoo's reporting features. Figure 4 provides a detailed mapping of how Odoo ERP reports correspond to SCOR-defined metrics, ensuring that the necessary data is available for performance monitoring and improvement.

By applying the Supply Chain Operations Reference (SCOR) framework, companies can systematically identify and assess key performance metrics essential for evaluating the efficiency and effectiveness of their supply chain operations. The SCOR model provides a comprehensive, standardized approach for measuring performance across five core supply chain processes: Plan, Make, Source, Deliver, and Return. In the context of this study, the SCOR performance metric calculations indicated that a total of 11

metrics could be effectively supported using Odoo ERP's built-in reporting functionalities. These metrics encompass various aspects of operational efficiency and customer satisfaction, providing a holistic view of supply chain performance.

Figure 4 presents a detailed mapping that illustrates how specific Odoo ERP reports align with the SCOR-defined metrics. This alignment ensures that the necessary data for ongoing performance monitoring and strategic improvement is both accessible and actionable within the system. The integration of SCOR metrics into Odoo's ERP environment allows organizations to better align their business processes with industry best practices, facilitating data-driven decision-making and continuous process optimization.

However, as this research focuses specifically on Perfect Order Fulfilment (POF) as the primary metric, not all SCOR metrics will be discussed in depth. POF was selected because it directly measures the reliability of the company's order fulfilment process, which was identified as a critical challenge. Through Odoo's integrated ERP system, reports such as Inventory Order Overview, Sales Forecast, and Manufacturing Order Analysis enable better demand planning, production scheduling, and inventory management, all of which contribute to improving POF.

Next, the research defines a new process flow, especially for fabric transfers from one location to another, as shown in Figure 5. This fabric transfer process is automatically managed by the system, which will arrange the transfer according to the order sequence from the customer. This flowchart does not include the purchasing and payment processes because the focus of process improvement is on manufacturing and inventory transfer processes.

Level 2 Process Category	Level 3 Process Element	Attribute	Metric	Ideal Process (to-be)	As-Is Situation (Gap)	ERP Module	Data Needed	ERP Reports
Level 1a				**Plan Process**				
Demand Planning	Order forecasting	Reliability, Responsiveness	Forecast Accuracy, Demand Planning Cycle Time	Auto forecasting using historical data	Sales data is not accurate hence the forecasting also not accurate	Sales - Feature Forecasting	Customer, Product, Pricelist	Sales Forecast, Order Analysis
Supply Planning	Raw material purchasing	Reliability	Supplier On-Time Delivery, Supply Planning Cost	Purchasing plan based on inventory stock and minimum order	No purchasing plan make the overstock or understock	Purchasing - Feature Purchase	Vendor, Lead time vendor, Product, Pricelist	Purchasing Analysis, Stock history
Production Scheduling	Managing minimum stock	Responsiveness, Agility	Replenishment Schedule	Minimum Stock Notification.	Manual checking impacting understock	Inventory - Feature Reordering Rules	Product, Bill of Material, Reordering Point	Inventory Replenishment
Level 1b				**Make Process**				
Production Execution	Production capacity setting	Reliability, Cost	Order Fulfillment Rate, Production Schedule	Monitoring Production Capacity	No scheduling monitoring and there is no linkage to customer order	Manufacturing - Feature Manufacturing Order	Product, Work Center, employee	Manufacturing Order Overview, Sales Order Analysis
Inventory Manage-ment	Product movement between location and delivery scheduling	Reliability, Responsiveness	Inventory Days of Supply, Perfect Order Fulfillment	Product movement between location and delivery scheduling based on customer order	Manual scheduling hence the order is likely late	Inventory - Feature Inventory Movement	Product, Location, Lot	Inventory Order Overview, Stock History
Cost Analysis	Managing product costing	Cost, Asset Management Efficiency	Manufacturing Cost per Unit, Cash-to-Cash Cycle Time	Calculate the unit cost automatically	The unit cost needs to be calculated manually in excel and not real time	Manufacturing - Product Cost, Financial - Unit Cost Analysis	Bill of Material, Cost Center	Unit Cost analysis, Billing and Receiving Cost Center analysis

Figure 4. SCOR process priority mapping

http://doi.org/10.30998/ jmil.v9i1.1572

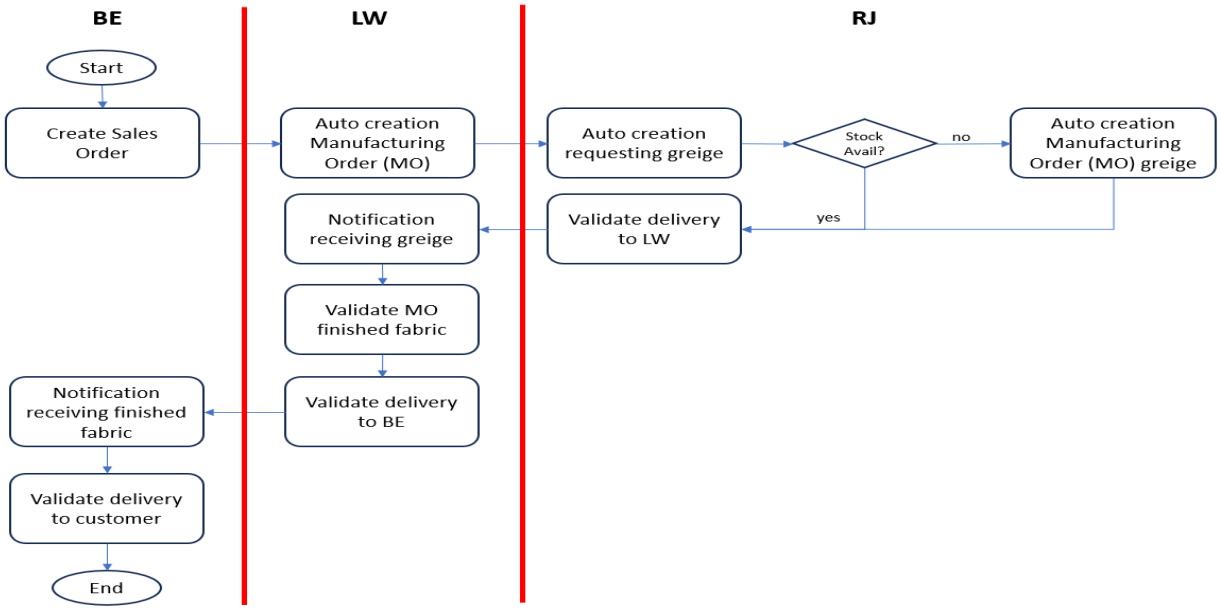

Figure 5. New business process (to-be)

In the Odoo ERP system, the fabric production schedule can be viewed through reports in the manufacturing module [16]. This helps production staff know how much fabric needs to be produced and the detailed processes required based on customer orders. Next, the fabric transfer schedule can be accessed via reports in the inventory module. This assists warehouse staff in determining how much fabric needs to be shipped to proceed with the next dyeing process. Figure 6 shows the production order and fabric transfer documents, which are automatically generated when a sales order or customer request is received.

Users can utilize sales order analysis to see which product types are most frequently ordered during each period. This report also allows users to view the order fulfillment quantity based on the number of orders and successful deliveries. Additionally, sales history data is directly linked to the forecasting feature, where users can view the predicted order quantities for future periods. The Odoo ERP system can also determine how much fabric needs to be produced to meet the forecasted customer orders. These report features are shown in Figures 7.

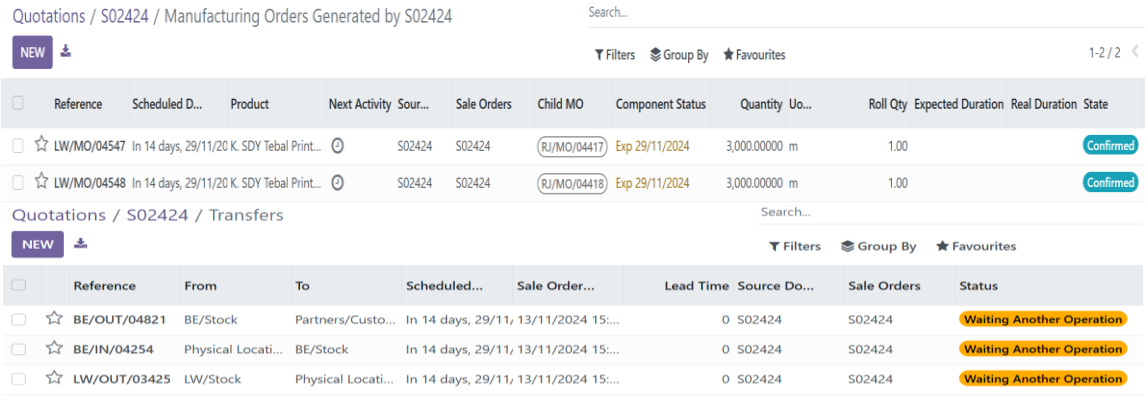

Figure 6. Manufacturing Order and Fabric Delivery Scheduling

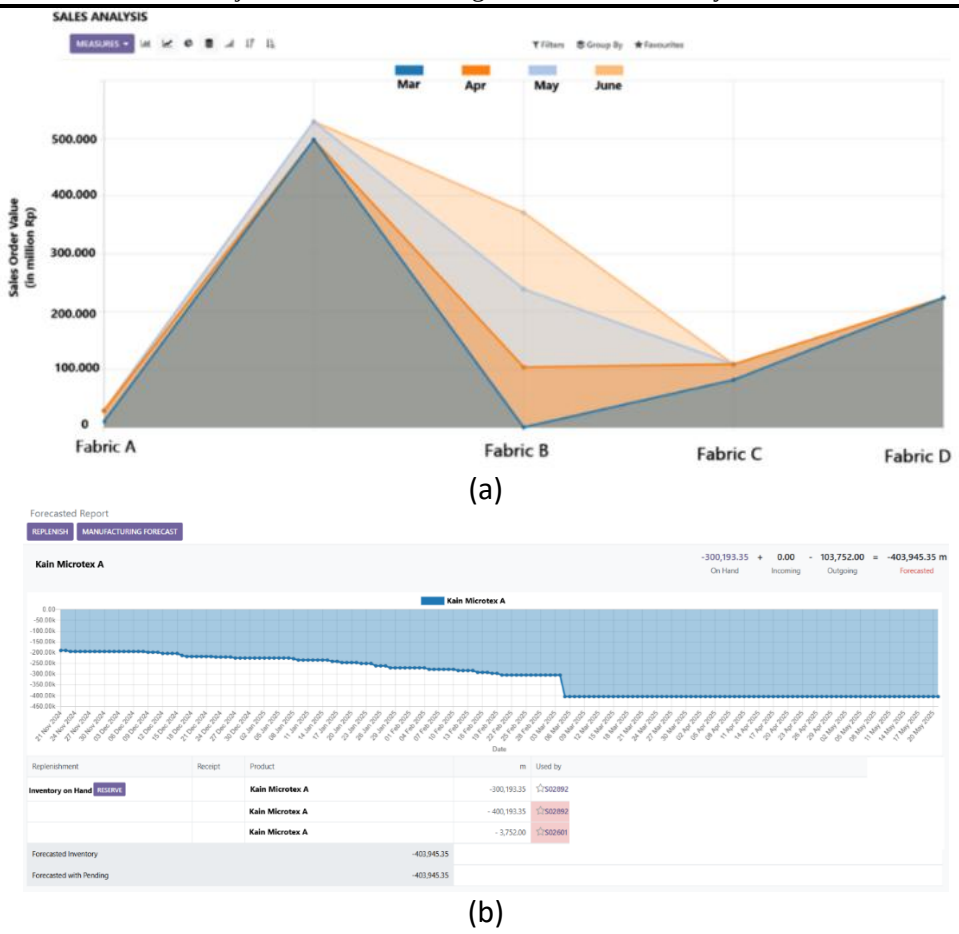

Figure 7. Odoo Reports = (a) Sales Analysis Report and (b) Inventory Replenishment Report

Implementing Odoo addressed these gaps by automating key processes and improving data accuracy through specific reports and modules. Sales Forecast and Order Analysis Reports enhanced forecasting accuracy by providing real-time insights into customer demand, reducing order inaccuracies. Manufacturing Order Overview and Sales Order Analysis Reports enabled automated scheduling and production monitoring, ensuring production alignment with customer needs and improving delivery times. Inventory Order Overview and Stock History Reports optimized inventory management by preventing stockouts and overstock, ensuring product availability and faster fulfilment.

Additionally, Unit Cost Analysis and Cost Center Analysis Reports improved cost calculation efficiency, providing real-time cost tracking and better pricing decisions. These enhanced ERP-driven processes directly increased order fulfilment rates, improved on-time delivery, and reduced delivery errors, thus resulting in a measurable improvement in POF performance. Hence, six gap process tests have been successfully completed, and reports are available to measure process performance that suitable with the SCOR metric defined in the figure 4. The progress visualization can be seen in the figure 8.

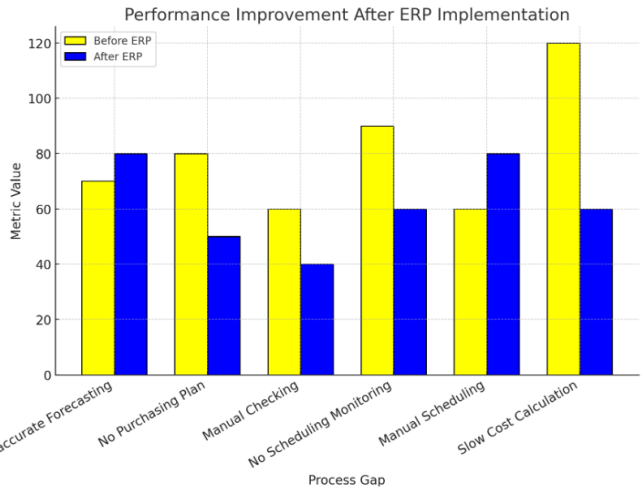

Figure 8. Performance improvement for process gap after ERP implementation

The testing process is conducted in two stages: unit testing and user acceptance testing (UAT). The unit testing phase is carried out by the research team and includes testing master data and processes separately. In the UAT phase, users test the system by inputting data across all processes to verify whether the gap analysis requirements have been successfully implemented. The test results can be seen in Table 1.

Table 1. Testing Result of Odoo ERP Reports

No	Process Gap	ERP Feature Applied	Test Criteria	Expected Outcome	Proven Improvement
1	Inaccurate Sales Data	Sales Forecasting	Forecast accuracy comparison	+10% improvement	Confirmed via test data
2	No Purchasing Plan Leading to Overstock/Understock	Reordering Rules	Reduced stock imbalance	-15% stock imbalance	Confirmed through ERP order analysis
3	Manual Checking Impacting Understock	Inventory Replenishment	Stock replenishment rate	+20% replenishment accuracy	Confirmed through ERP order analysis
4	No Scheduling Monitoring and No Linkage to Customer Order	Manufacturing Scheduling	On-time order fulfillment	+20% reduction in delays	Test shows scheduling accuracy increased
5	Manual Scheduling Likely Leading to Late Orders	Manufacturing Scheduling	On-time order fulfillment	+20% reduction in delays	Test shows scheduling accuracy increased
6	Manual Cost Calculation Using Excel and Not Real-Time	Automated Cost Calculation	Time to calculate costs	50% faster	Confirmed via ERP report

The implementation of the Odoo ERP system also requires adequate information technology infrastructure. Referring to the needs of CV PJ, the server can still use a local server accessed via a local area network (LAN). This study does not address network configuration as CV PJ already has a LAN setup at its three branch locations. For other SMEs, a cloud-based server might be needed to use to simplify server configuration. In addition to the infrastructure procurement costs, costs for analysts and programmers are also required. The total cost needed for the implementation of the Odoo ERP system at CV PJ is Rp 30,400,000, as shown in Table 2. However, it is important to note that CV PJ already has user computers and adequate network configuration, so no additional costs are required for these two aspects.

Beyond technical preparation, the organization also needs to prepare managerial and operational aspects. First, support and awareness from each relevant department are necessary. This requires leadership skills to persuade employees, especially department heads. In SMEs, this is relatively easier to achieve due to the centralized authority and leadership structure, where employees generally support leadership decisions. However, it is important to offer incentives or other rewards to employees to encourage enthusiasm for the changes.

Table 2. Implementation Cost

Component	Description	Quantity	Amount (Rp.)
Server	*Operating System:* Windows 10, RAM 16 Gb, *Processor* 64-bit Intel Machine	1	10.000.000
UPS	Watt 1300W	1	2.400.000
Analytic cost	System Configuration	50 days	15.000.000
Programmer cost	Report and printing customed	10 days	2.500.000
User manual		20	500.000
	Total cost		**30.400.000**

At CV PJ, the training is conducted intensively for one week to ensure employees can effectively use the system. Additionally, during the first month, the research team will assist the company to ensure employees can carry out their tasks properly. Any business processes that are not adequately covered or do not align with the Odoo ERP system will be noted and addressed in future development stages. This research ensure that system development always refers to the gap analysis conducted earlier to ensure the ERP system development aligns with the SCOR model. By using Odoo ERP system, customer order information from sales department can be integrated to manufacturing and inventory department in each location. It enables the manufacturing schedule and delivery schedule to be easily sorted out based on the customer order. Additionally, using the sales history, purchasing department also can calculate the raw material requirement more accurately which has a positive impact to achieve on time manufacturing process. These things help the company able to deliver the whole order quantity to customer. At first month, the employees were still trying to adapt the new system and after some training and adaptation process, the employee could be discipline to input the data into system.

Table 3. Perfect Order Fulfilment Rate after using Odoo ERP System

Period	Total Order	Total Perfect Order	POF Rate (Total Perfect Order/ Total Order) *100%
Period 1	389	254	65,19%
Period 2	396	348	87,80%
Period 3	445	396	88,99%
Period 4	520	488	93,94%
Period 5	436	409	93,76%
Period 6	480	458	95,32%

After it had been running for six months, the perfect order fulfilment performance can be calculated. Using the formula in Equation 1, we can calculate the perfect order rate per period. Hence, Table 3 shows an improvement in perfect order fulfilment from the first to the sixth month after implementing the Odoo ERP system. The average perfect order fulfilment rate is 87.50%, which is considered excellent, although still below the management target of 98%. According to the American Productivity & Quality Center (APQC), the median perfect order index is 90%, indicating that 10% of orders experience some form of failure. This suggests that a POF rate in the period 4 until 6 generally considered excellent. Also, it can be concluded that the perfect order fulfilment performance has improved after implementing the Odoo ERP system as shown in Figure 9. The steady increase in POF demonstrates how data integration and process automation contribute to more consistent order accuracy. This improvement highlights the potential of ERP systems to support strategic goals related to customer satisfaction and operational excellence.

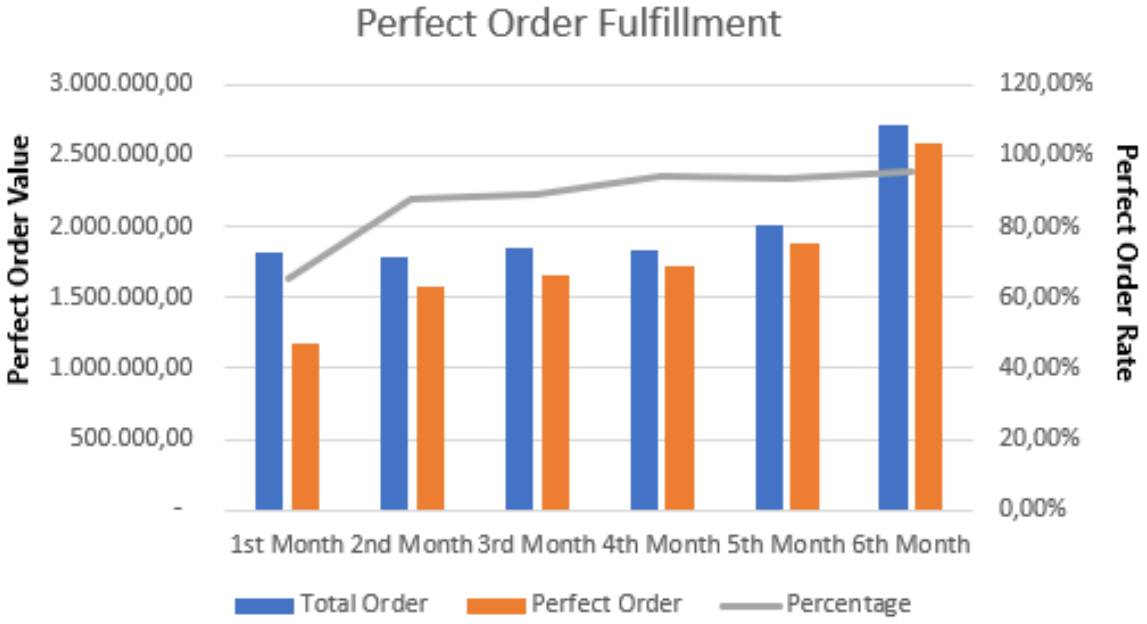

Figure 9. Perfect Order Fulfilment Rate after using Odoo ERP System in graphic

CONCLUSION

This research has successfully improved the accuracy of perfect order fulfilment by automating production orders and raw fabric transfer orders between the company's branch locations. This automation allows the production scheduling process to align with customer order sequences. The automation is achieved through the Odoo ERP system by configuring the manufacturing and inventory modules. Additionally, the Odoo ERP system has generated forecast and replenishment reports, enabling the production and purchasing departments to make more accurate stock fulfilment decisions. The Odoo ERP system configuration follows the SCOR process, providing reports that assist the company in measuring its performance that refer to standard supply chain framework. This research calculated the reliability attribute, showing that the company's average perfect order fulfilment rate is 87.50%, which falls within the excellent category. In future research, calculations of other attributes and metrics can be performed to assess the overall SCOR process value at PT PJ.

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