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DEVELOPING WORK ORDER MANAGEMENT SYSTEM WITH CIRCULAR ECONOMY APPROACH USING ASAP METHOD

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ABSTRACT

CV PG STTT is a garment manufacturing company that specializes in producing chemical laboratory coats and technical PDL (Personal Duty Line) shirts. The company operates on a make-to-order system. However, its production processes remain entirely manual, resulting in challenges related to production monitoring, tracking, and recording. Furthermore, the company still adheres to a linear economy model, where production waste is discarded without being repurposed. To address these issues, the implementation of an extended work order management system using a circular economy approach offers a viable solution. This approach not only minimizes production waste but also enhances the monitoring of production processes. The extended work order management system is developed using the Accelerated SAP (ASAP) methodology. The research follows several stages, including observation, interviews, analysis, and the proposal of a system design through configuration and adjustment of manufacturing modules, followed by testing the manufacturing modules. The outcome of this study is an ERP system on Odoo with customized module to align with the company's business processes and proposed workflows. This system simplifies production processes at CV PG STTT while promoting sustainability and supporting the transition to a circular economy.

Keywords : Circular Economy; Garment Production; Work Order Management; ERP

ABSTRAK

CV PG STTT adalah perusahaan manufaktur garmen yang mengkhususkan diri dalam memproduksi jas laboratorium kimia dan kemeja teknis PDL (Personal Duty Line). Perusahaan ini beroperasi dengan sistem make-to-order, namun seluruh proses produksinya masih dilakukan secara manual. Hal ini menyebabkan tantangan dalam pemantauan, pelacakan, dan pencatatan proses produksi. Selain itu, perusahaan masih menerapkan model ekonomi linear, di mana limbah produksi dibuang tanpa diolah kembali. Untuk mengatasi permasalahan ini, implementasi sistem manajemen pesanan kerja yang diperluas dengan pendekatan ekonomi sirkular menjadi solusi yang layak. Pendekatan ini tidak hanya meminimalkan limbah produksi, tetapi juga meningkatkan pemantauan proses produksi. Sistem manajemen pesanan kerja yang diperluas dikembangkan menggunakan metodologi Accelerated SAP (ASAP). Penelitian ini mencakup beberapa tahapan, termasuk observasi, wawancara, analisis, serta perancangan sistem melalui konfigurasi dan penyesuaian modul manufaktur, yang diikuti oleh pengujian modul-modul tersebut. Hasil dari penelitian ini adalah sebuah sistem ERP berbasis Odoo dengan modul yang telah disesuaikan agar selaras dengan proses bisnis dan alur kerja yang diusulkan oleh perusahaan. Sistem ini menyederhanakan proses produksi di CV PG STTT sekaligus mendorong keberlanjutan dan mendukung transisi menuju ekonomi sirkular.

Kata kunci : Ekonomi Sirkular; Produksi Garmen; Manajemen Perintah Kerja; ERP

INTRODUCTION

Bagian The garment industry produces ready-to-wear clothing and related apparel items, and it become fourth-largest contributor to Indonesia's foreign exchange earnings after oil and gas (Migas). According to statistical data from Indonesia's Central Bureau of Statistics, the clothing production index has shown a consistent annual increase, with values recorded at 110.62 in 2016, 116.45 in 2017, 140.04 in 2018, 165.96 in 2019, 128.03 in 2020, 107.70 in 2021, 134.52 in 2022, 134.78 in 2023, and 164.59 in the first quarter of 2024 (Badan Pusat Statistik, 2024). The export market for the garment industry extends beyond domestic consumers to international clients. According to the Indonesian Ministry of Industry, in 2024, the export value of the textile industry, including garments, ranked fourth in export trends, amounting to USD 3.38 billion or approximately IDR 53.73 trillion (Kementerian Perindustrian, 2024). However, the production process generates significant amounts of textile waste and wastewater, which can contribute to environmental pollution if not managed properly. According to Earth.org, The global textile industry generates approximately 92 million tons of waste annually, with projections indicating this figure could rise to 134 million tons per year by 2030 if current trends persist (Earth.org, 2023) This waste contributes to environmental pollution, as a significant portion ends up in landfills or is incinerated. It make all of textile and clothing industries such CV PG STTT is responsible for about 10% of global carbon emissions, highlighting the need for sustainable practices within the sector.

The increasing scale of production has resulted in a corresponding rise in production waste, underscoring the need for environmentally friendly practices in the industry. This necessity aligns with Indonesia's Law No. 3 of 2014, Article 30, which mandates efficient and environmentally responsible use of natural resources, further emphasizing the importance of developing sustainable industrial practices (Reda, 2017). CV PG STTT faces two primary challenges: the need to establish an environmentally friendly clothing production process and the necessity of an integrated system across different departments to streamline monitoring, tracking, and production reporting. To address these challenges, the company seeks to implement supply chain management through an integrated work order management system using a circular economy approach. This system incorporates modules for purchasing, inventory, manufacturing,

sales, and waste management (Waaly et al., 2018). The integrated system, referred to as Enterprise Resource Planning (ERP), is designed to optimize business processes and promote sustainability. In this study, the ERP system is implemented using the Odoo application and the Accelerated SAP (ASAP) methodology (Y. Putri, A. Y. Ridwan, and R. W. Witjaksono, 2018). By incorporating a waste management module, the system aligns with Sustainable Development Goal (SDG) No. 12, which focuses on responsible consumption and production, thereby supporting sustainability actions and ensuring efficient resource utilization.

LITERATUR REVIEW

Enterprise Resouce Planning

Enterprise Resource Planning (ERP) is a software system that integrates and coordinates information across various business areas in real-time. ERP systems comprise multiple interconnected modules, including Sales and Distribution, Material Management, Production Planning, Quality Management, Plant Maintenance, Asset Management, Human Resources, Project Systems, Financial Accounting, and Controlling. These modules collectively provide essential functionalities for companies in key areas such as finance, production, logistics, and human resources, all streamlined within a single software package (Ellen Monk, 2008).

Recent studies have highlighted the significant impact of ERP systems on organizational performance. For instance, a study by (AlBar & Hoque, 2019) found that ERP implementation enhances operational efficiency and decision-making processes by providing real-time data access and integration across departments. The research emphasizes that the successful adoption of ERP systems leads to improved resource management and overall business performance.

Odoo

Odoo is a web-based application developed using Python, XML, and JavaScript, with PostgreSQL as its database. Odoo stands out as a unique management system that is not only utilized by large enterprises but is also widely adopted by small businesses and independent companies (Hevner & Chatterjee, 2010). Odoo's flexibility and modular architecture make it highly adaptable to businesses of all sizes and industries. It offers a comprehensive suite of applications, including modules for accounting, inventory, sales, manufacturing, human resources, and more, enabling businesses to

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tailor the system to their specific needs. Moreover, its open-source nature allows developers to customize and extend its functionalities, making it a cost-effective solution compared to proprietary ERP systems.

Accelerated SAP (ASAP) Method

Accelerated SAP (ASAP) is a methodology developed by SAP for ERP implementation. This approach leverages core methodologies and tools to enable rapid development, deliver reliable results, and assist users in achieving optimal business solutions. The ASAP methodology is structured into five distinct phases (Ellen Monk, 2008):

1. Project Preparation: This initial phase focuses on defining the project scope, assembling the project team, and setting goals and timelines.
2. Business Blueprint: In this phase, detailed documentation of business processes and requirements is created to serve as the foundation for the ERP configuration.
3. Realization: The ERP system is configured and customized according to the business blueprint, and initial testing is conducted to ensure functionality.
4. Final Preparation: This phase involves final testing, user training, and addressing any remaining issues to prepare for the system's deployment.
5. Go Live and Support: The ERP system is deployed into production, and ongoing support is provided to ensure a smooth transition and resolve any operational challenges.

Fabric Waste Management

Fabric waste management is a critical component of sustainable textile production, addressing the significant environmental impact associated with textile waste. The textile industry generates substantial waste during both manufacturing and post-consumer phases, contributing to environmental degradation. Implementing effective waste management strategies, such as recycling and upcycling, is essential to mitigate these effects. Mechanical recycling processes, which involve shredding textile fabrics into fibers for re-spinning into yarn, have been widely explored as a means to reduce waste while maintaining material utility (Khairul Akter et al., 2022). Additionally, chemical recycling methods, which dissolve textile waste to regenerate fibers, offer the potential for producing high-quality recycled materials, making them suitable for a range of applications (Sandin & Peters, 2018).

Adopting circular economy principles in fabric waste management plays a pivotal role in conserving resources and advancing environmental sustainability. This approach prioritizes the reuse, recycling, and repurposing of fabric waste, effectively transforming what would traditionally be discarded into valuable inputs for new products. By shifting away from the linear "take-make-dispose" model, circular economy practices encourage prolonged material lifecycles, reducing the need for virgin resources and mitigating environmental pollution. Recent studies highlight the potential of circular systems to significantly lower the ecological footprint of the textile industry by fostering innovation in waste utilization, improving resource efficiency, and creating closed-loop systems that benefit both the environment and the economy (Ghisellini et al., 2016).

Furthermore, integrating biotextiles—materials derived from renewable sources such as organic cotton, hemp, and bamboo—into production processes offers a significant advantage in reducing environmental harm. Biotextiles are not only biodegradable but also contribute to decreasing reliance on synthetic fibers, which are often petroleum-based and non-biodegradable. Their use aligns with sustainable practices by ensuring that post-consumer textile waste can decompose naturally, minimizing its long-term environmental impact. Additionally, incorporating biotextiles into fabric waste management strategies supports innovation in product design and manufacturing, paving the way for more eco-friendly textile products that cater to growing consumer demand for sustainability. This approach addresses the industry's environmental challenges while promoting a shift toward a more responsible and resource-conscious fashion and textile sector (Fletcher, 2012).

Circular Economy

The circular economy is an economic model aimed at minimizing waste and making the most of resources by creating closed-loop systems where products, materials, and resources are reused, repaired, refurbished, and recycled for as long as possible. This approach contrasts with the traditional linear economy, which follows a 'take-make-dispose' pattern, leading to significant resource depletion and environmental degradation. By emphasizing sustainability, the circular economy seeks to decouple economic growth from resource consumption, fostering innovation and reducing environmental impact.

In the textile and garment industry, the adoption of circular economy principles has gained momentum as a response to the sector's substantial environmental footprint. A recent study by (Gautam, 2024) critically analyzes the integration of circular economy and sustainable development within the fashion industry, highlighting the urgent need for change due to the industry's significant ecological impact. The research identifies implementation challenges and emphasizes the timeliness of shifting towards sustainable fashion practices.

Another study by (Cosma, 2024) explores sustainable clothing consumption in middle-income countries, focusing on Romanian consumers. The findings indicate that altruistic value orientation, subjective norms, and sustainable attitudes positively influence consumers' purchase intentions toward sustainable clothing. These insights provide essential practical implications for advocating sustainable clothing consumption and offer guidelines for practitioners in the textile industry to reduce overconsumption.

RESEARCH METHODOLOGY

Method is a method of work that can be used to obtain something. While the research method can be interpreted as a work procedure in the research process, both in searching for data or disclosing existing phenomena (Zulkarnaen, W., et al., 2020:229). The research began with a comprehensive observation of the entire production line at CV PG STTT and interviews with relevant stakeholders, including production operators, production supervisors, garment department managers, and fabric artisans. The findings from these observations and interviews revealed the following key issues: (1) the entire production process at CV PG STTT is still conducted manually, from administrative tasks to operational activities, leading to frequent production delays and data inconsistencies; (2) production waste from the cutting workshop is directly disposed of without further utilization; (3) there is potential for the reuse of production waste by fabric artisans, but artisans face challenges in obtaining raw materials when needed.

To address these issues, an Enterprise Resource Planning (ERP)-based work order management system is necessary to achieve the following: (1) facilitate comprehensive recording, monitoring, and tracking of the entire production process; and (2) enable integrated monitoring and utilization of production waste between CV PG STTT and fabric artisans. The development of this information system employs SAP

ERP technology through the manufacturing module and adopts the Accelerated System Application & Product (ASAP) methodology.

The outcome of this research is the design of a circular economy-based information system for the production process at CV PG STTT using the Odoo platform. This system aims to enhance efficiency in production management and promote sustainable practices through waste reuse and integrated production monitoring. The research methodology can be seen in **Figure 1**.

RESULT AND DISSCUSSION

Result

The implementation of the ERP system in this study utilizes the ASAP methodology, which comprises several phases: Project Preparation, Business Blueprint, Realization, Final Preparation, and Go-Live. However, this research is conducted only up to the Final Preparation phase. The process begins with interviews conducted with relevant departments within the company to gather information and understand the background of the existing issues. This information is used to document the current business processes, and references from journals and books are reviewed to support the analysis and development of the system. During the Business Blueprint phase, the collected data is analyzed to examine the existing business processes, evaluate forms, and identify gaps (GAP analysis) between the current state and the desired system functionalities.

The next phase involves developing proposed business processes based on the results of the previous analysis. These proposed processes are then implemented during the Realization phase. In this phase, the Odoo manufacturing module is configured to align with the proposed business processes, ensuring that the system is tailored to meet the specific needs of the company. Subsequently, company production data is entered into the system as part of the preparation for its operation. The final phase of this research consists of a conclusion, summarizing the findings, and providing recommendations for further improvements based on the study conducted.

Project Preparation

Project Preparation is the initial phase in planning and developing an ERP system for the manufacturing module using a circular economy approach. This stage

involves identifying and outlining the requirements needed to design and implement the system effectively.

Key objectives for system development in this phase include:

a. Building a manufacturing system with a circular economy approach based on ERP at CV PG STTT, ensuring seamless integration with activities across the production processes.
b. Developing a manufacturing system with a circular economy approach that integrates intermediaries and fabric waste artisans to ensure the sustainable utilization of leftover materials.
c. Designing an ERP system using Odoo for the manufacturing department at CV PG STTT, incorporating a circular economy approach to enhance sustainability in production processes.
d. Implementing the ERP system design using the ASAP (Accelerated SAP) methodology at CV PG STTT, ensuring an efficient and structured deployment process.
e. Establishing production business processes that encompass the entire production cycle, including the integration of systems for utilizing production waste effectively, thereby promoting sustainability and reducing environmental impact.

Business Blueprint

The Business Blueprint phase involves the identification and documentation of the company's existing business processes, which serves as a foundation for improvement. This phase produces a comprehensive document outlining the current workflows and the proposed enhancements through the development of an ERP-based green manufacturing system.

a. Pre-Production

User Requirement:

The system must be capable of recording the list of required materials, documenting production procedures, and scheduling production activities.

Existing Business Processes (As-Is):

Material requirements are still recorded manually and communicated to the inventory department.

Proposed Business Processes (To-Be):

The system will include a Bill of Materials (BOM) feature that allows for the automatic identification of required materials. Users can navigate to the Products menu, select Bill of Materials, and create entries directly within the system, streamlining material management and integration with other production processes.

b.Raw Material Order

User Requirement:

With the implementation of the Odoo system, sales orders can be sent directly and automatically to the manufacturing department.

Existing Business Processes (As-Is):

Sales orders are created and then manually delivered to the manufacturing department in the form of physical document forms.

Proposed Business Processes (To-Be):

Using the Odoo system, sales orders that have been created will be automatically integrated with the manufacturing department. These sales orders will be instantly converted into manufacturing orders by the system, eliminating manual processes and enhancing operational efficiency.

c. Production Section

User Requirement:

With the implementation of the Odoo system, sales orders can be sent directly and automatically to the manufacturing department. The entire production flow will be recorded clearly and accurately, making it easier to understand and reducing the risk of errors. Additionally, in this phase, production waste from the cutting process will be documented and collected for reuse, promoting sustainability.

Existing Business Processes (As-Is):

The entire production flow is not properly documented due to manual processes, leading to frequent errors during production.

Proposed Business Processes (To-Be):

The entire production flow, along with fabric waste from production, will be securely recorded and stored in the system. This ensures accurate documentation, better traceability, and the ability to repurpose waste materials effectively.

d.Waste Management Section

User Requirement:

With the implementation of the Odoo system, production waste can be properly recorded and efficiently distributed to intermediaries and fabric waste artisans for further processing and utilization.

Existing Business Processes (As-Is):

Production waste is neither managed nor documented effectively, and there is no integration with external parties, such as waste handlers and artisans, who could repurpose the fabric waste.

Proposed Business Processes (To-Be):

All production waste will be accurately recorded within the system, and information regarding the waste will be systematically connected to intermediaries and artisans. This integration enables the waste to be repurposed effectively, supporting sustainable production practices.

e. Manufacturing Activity Report

User Requirement:

The system provides reporting capabilities that make it easier to evaluate and monitor processes, and these reports can be accessed by management or other relevant stakeholders as needed.

Existing Business Processes (As-Is):

The results of manufacturing activities are not stored in a system and are still recorded manually.

Proposed Business Processes (To-Be):

All manufacturing activity documents will be automatically generated by the system and can be printed whenever necessary, ensuring better organization and accessibility.

f. Bill of Materials Report

User Requirement:

The system enables the generation of Bill of Material (BOM) reports, which include the quantity and cost of raw materials used in the production process.

Existing Business Processes (As-Is):

There is no existing process for recording the Bill of Material.

Proposed Business Processes (To-Be):

All Bill of Material documents will be automatically generated by the system and can be printed whenever needed, ensuring accurate and efficient tracking of production materials.

g. Work Center Report

User Requirement:

The system provides the capability to generate work center reports that include information on production activities and the utilization of fabric waste from production.

Existing Business Processes (As-Is):

There is no existing reporting system for work center processes.

Proposed Business Processes (To-Be):

All work center documents will be automatically generated by the system and can be printed as needed, ensuring accurate tracking of production processes and waste utilization.

Proposed Business Process (To-Be) in Production Section

1. **Proposed Business Process in Overall Manufacturing**

   The proposed overall manufacturing process can be sen in **Figure 2**. In the sales process, the sales department sends a sales order to the production department. The production department then creates a list of required raw materials and shares it with the sales department. Afterward, the sales department delivers the necessary materials to the production department, which proceeds with the production process. Once the goods are completed, they are handed over to the shipping department for delivery

2. **Proposed Business Process in Pre-Production**

   The proposed business process in Pre-Production can be seen in Figure 3. The sales department creates a sales order and sends it to the production department, which prepares a material list and forwards it to the procurement department. The procurement department then supplies the required materials to the production department for processing.

3. **Proposed Business Process in Raw Material Order**

   The Proposed Businee process in Raw Material Order can be seen in Figure 4. In the production process, upon receiving a sales order, a material list is created and sent to the procurement department. If the required materials are available, they are immediately sent to the production department. However, if materials are unavailable,

a purchase order is generated by the procurement department to acquire the necessary items.

4. **Proposed Business Production Workflow**

   The proposed business process in production section can be seen in Figure 5. In the procurement process, raw materials are sent to the production department for processing. During the production workflow, the fabric waste generated from the cutting process is recorded and collected. After this, the production process continues until the final product is completed. Once the finished goods are ready, they are sent to the sales department for further distribution.

5. **Proposed Business Process Production Activity Report**

   The proposed business process in production activity report can be seen in Figure 6. At this stage, a comprehensive report of all production activities is generated based on the completed manufacturing orders. This report provides a detailed overview of the production process and its outcomes.

Realization

The realization phase focuses on designing and developing the system based on the comparison between the existing business processes (As-Is) and the proposed business processes (To-Be), as established during the Business Blueprint phase.

Final Preparation

The final preparation phase is the last step before implementing the Odoo ERP system in the company. During this phase, the system undergoes complete configuration and customization. Final adjustments are made to ensure the system is fully prepared for deployment, addressing any issues and aligning it with the company's operational requirements.

Discussion

In the previous phase, interviews were conducted with the company to understand the existing business processes (As-Is). The next step involves identifying issues within these existing processes. Once the problems are identified, the researcher proposes new business processes and analyzes how these processes can be implemented using the Odoo application. A GAP analysis is then conducted to evaluate discrepancies in the business processes, forms, and reports used by the company and those available in the Odoo application, ensuring necessary adjustments can be made.

Following this, the system configuration phase begins. This configuration process tailors the Odoo system to meet the specific requirements of the company. Key activities include setting up user accounts and access permissions, integrating the necessary modules, and configuring features such as manufacturing orders generated from sales orders, work center settings, routing, bill of materials, and work order management. These configurations ensure that the system aligns with the company's needs and supports seamless integration across all modules. The table of customization manufacturing modul can be seen in Table 1.

Here are the result of customization modul in manufacturing modul with sustainability aspect:

1. The work center for each actor in the system can be seen in Figure 7. Work Center for each actor in the Waste Management ecosystem, consisting of CV PG STTT, Intermediaries, and Craftsmen.
2. The operations for each actor in the system can be seen in Figure 8. Operations for each actor connected within their respective work centers to determine productivity and record production activities carried out in each work center.
3. The work center form can be seen in Figure 9. In the work center form, additional fields for *fabric waste* and *eco-material* are included to track the fabric's weight and determine whether the material used is eco-friendly.
4. The manufacturing order form for CV PG STTT can be seen in Figure 10. In the manufacturing order form for CV PG STTT, additional fields are included to enhance data tracking such Fabric Type to Lists the types of fabrics used in production, Quantity of Fabric Waste (Kg) to Records the amount of production fabric waste generated, measured in kilograms, Total Fabric Efficiency to Calculates the total fabric efficiency achieved during production, and Waste Destination to Specifies the final destination for the fabric waste generated, ensuring proper waste management and tracking.
5. The manufacturing order form for Intermedairy can be seen in Figure 11. In the manufacturing order form for Intermediaries, several additional fields are introduced to enhance waste management processes. The Processing Method field specifies the type of processing method applied to the fabric waste. The Waste Received Quantity field records the amount of fabric waste received from CV PG STTT. The Waste

Output field identifies the potential next stages for the processed fabric waste. And Available Quantity field tracks the amount of material available for use in subsequent stages.

6. The manufacturing order form for Craftmen can be seen in Figure 12. In the manufacturing order form for Craftsmen, additional fields are included to facilitate better tracking and utilization of materials. The Material Type field records the type of material received from intermediaries, providing clear information on the input resources. The Received Quantity field tracks the amount of material received from intermediaries, ensuring accurate documentation. The Potential Product field captures the potential utilization of processed fabric waste for creating new products, highlighting opportunities for innovation. Finally, the Utilized Quantity field documents the amount of production fabric waste used in crafting new products.
7. The overall manufacturing overview can be seen in Figure 13. In these manufacturing overview, the cost are breakdowned based on the produced item, with this system we can also know the unit cost of every produced item as Cost of Good Sold. Not only that, fabric waste from manufacturing process also shown in this overview, complete with the calculation of it unit cost.
8. The sales form of fabric waste can be seen in Figure 14. In this sales form, the fabric waste can be sold to the intermediary to become a new product in the future. In this case the fabric waste price is adjusted based on cost of goods sold that obtained from manufacturing overview calculations.

CONCLUSION

With this ERP system, designed as an extended work order management solution, enables seamless integration among various departments in the garment sector, including sales, production, inventory, and procurement. This integration is evident in processes such as the sales module, where creating a sales order automatically forwards it to the manufacturing department. The manufacturing department then generates a list of required materials and sends it to the inventory department to request materials for the production process.

Additionally, the ERP system facilitates the documentation of production waste and connects its utilization to external parties, such as intermediaries involved in waste management and craftsmen who repurpose the waste into new products. This ensures

that previously unutilized production waste is now repurposed, promoting sustainability. Furthermore, periodic production reports can be automatically generated in alignment with ongoing production activities, enhancing monitoring and evaluation across departments.

In the designed system, Intermediaries and Craftsmen are incorporated into a single ERP system as part of the Work Center in Manufacturing module. To achieve more optimal integration, a dedicated ERP module can be developed specifically for Intermediaries and Craftsmen. This tailored module would enable each actor within the waste management ecosystem to maximize their roles, ensuring seamless coordination and enhancing the overall efficiency and effectiveness of the system.

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TABLE & FIGURE

Table 1 Customization Manufacturing Modul

Form	Field
Bill Of Materials	Eco-Material
	Fabric Weight
Work Order CV PG STTT	Fabric Waste Type
	Quantity of Waste
	Destinantion
Work Order Intermediary	Fabric Waste Type
	Quantity of Waste
	Processing Method
	Waste Output
Work Order Craftmen	Material Type
	Potential Product
	Utilized Quantity

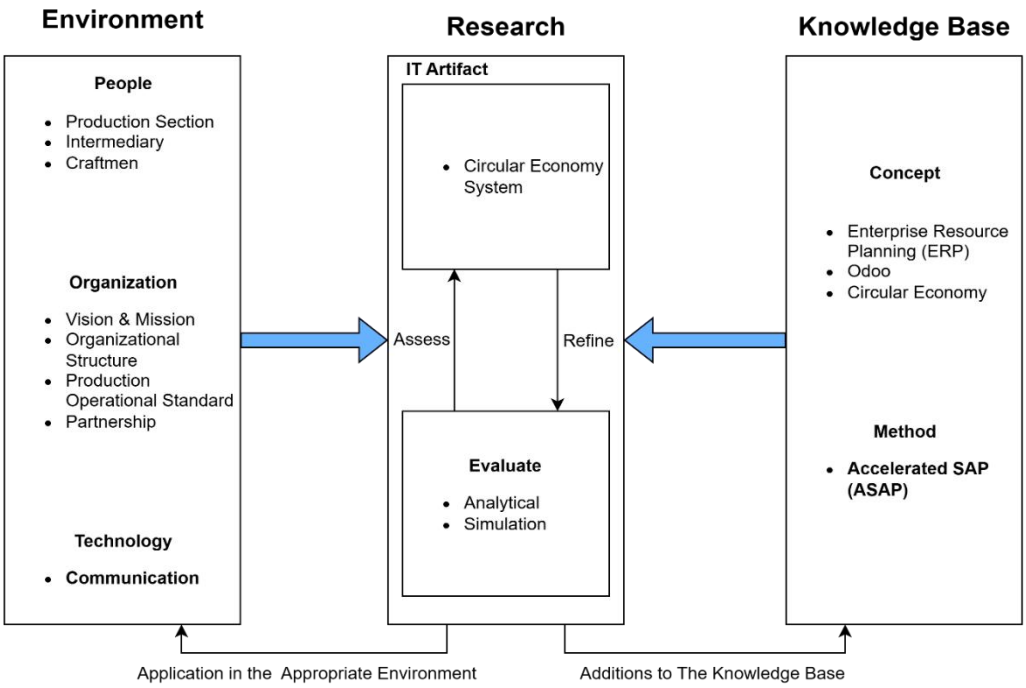

Figure 1 Research Methodology

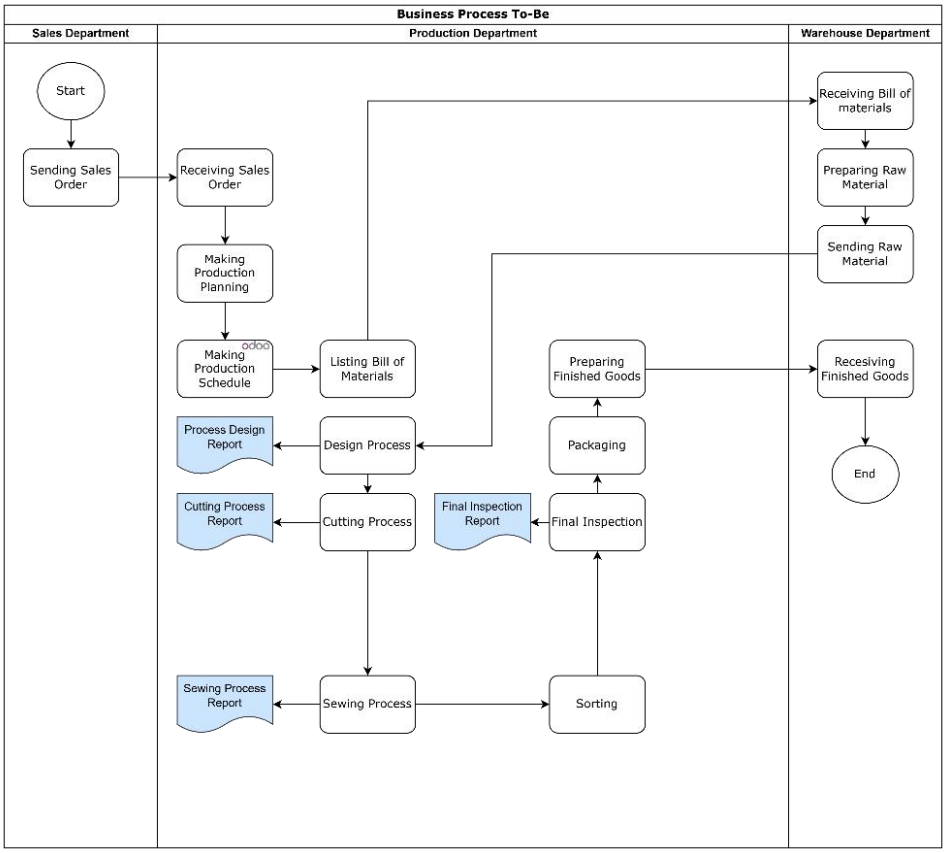

Figure 2 Proposed Overall Manufacturing Process

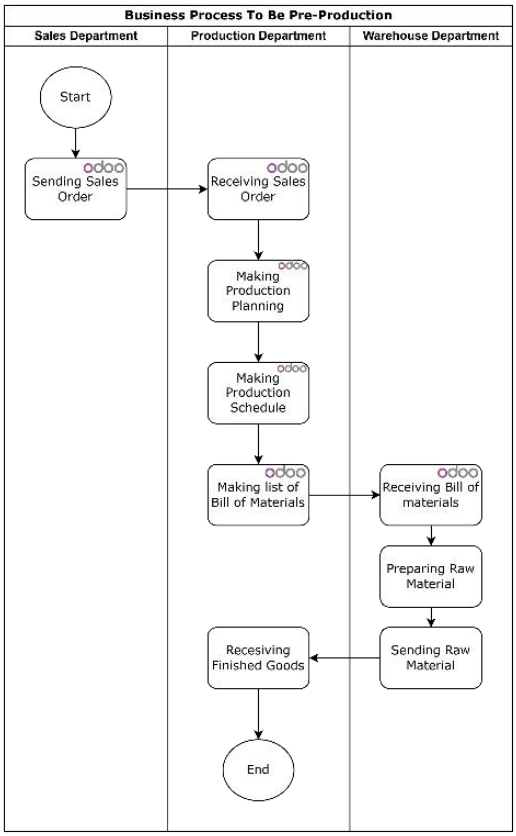

Figure 3 Proposed Business Process in Pre-Production

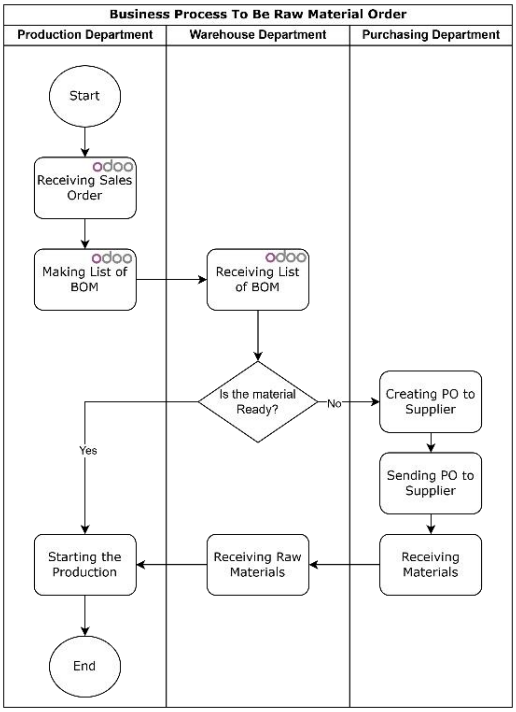

Figure 4 Proposed Business Process in Raw Material Order

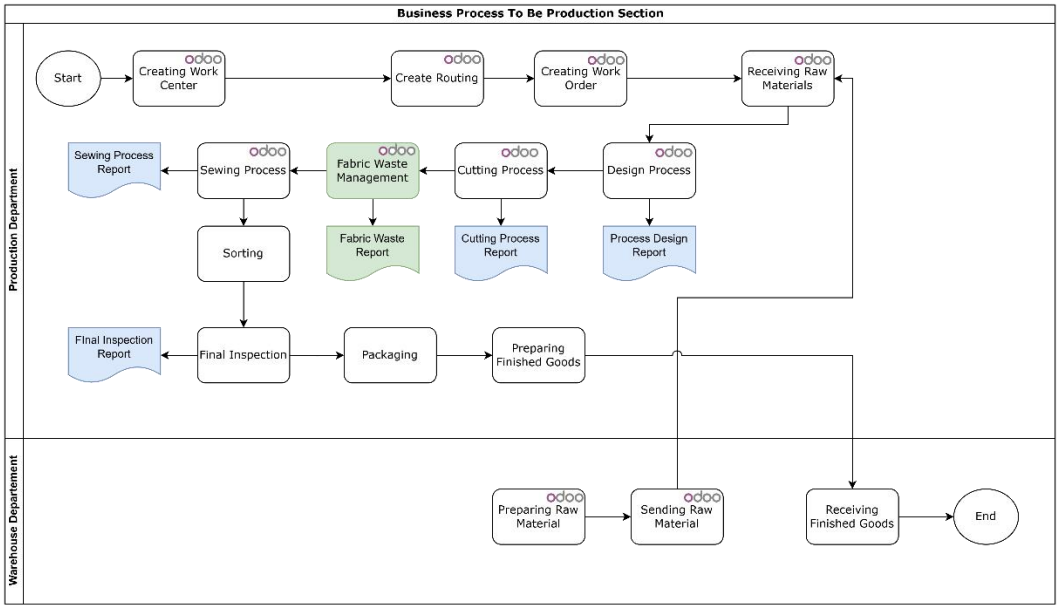

Figure 5 Proposed Business Process in Production

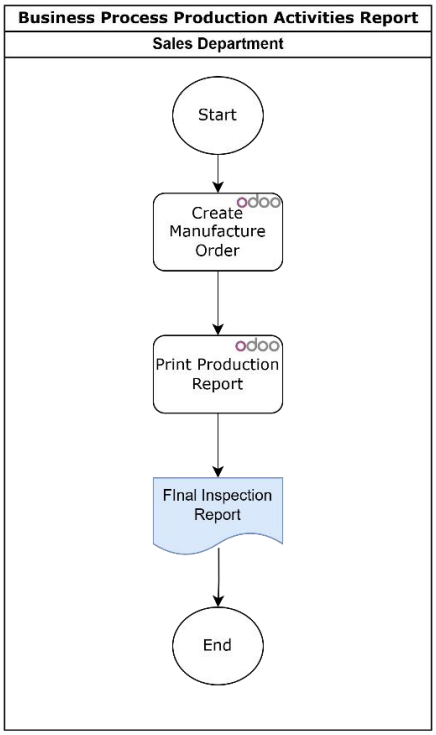

Figure 6 Proposed Business Process in Production Activity Report

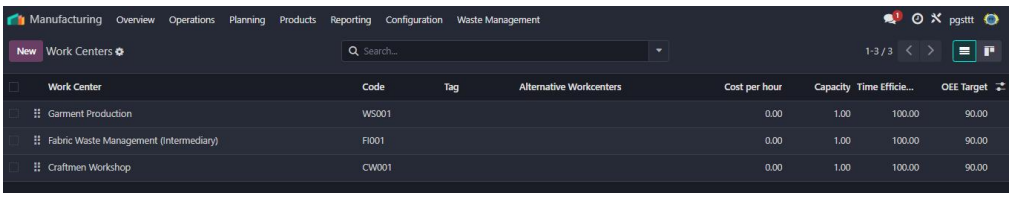

Figure 7 Work Center for Each Actor in The System

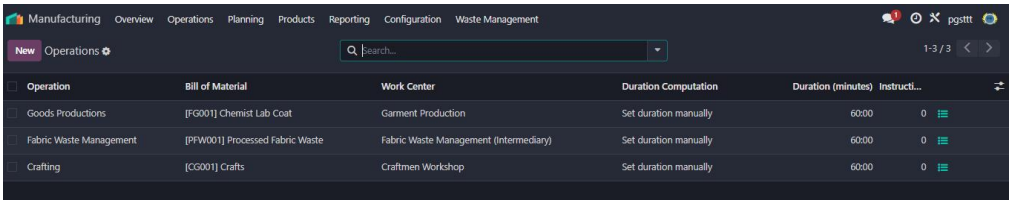

Figure 8 Operations for Each Actors in The System

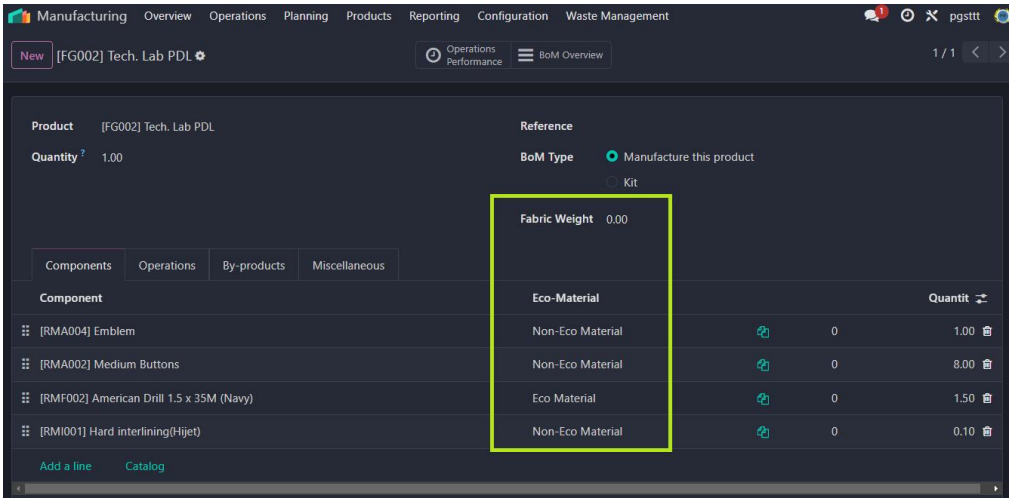

Figure 9 Work Center Form

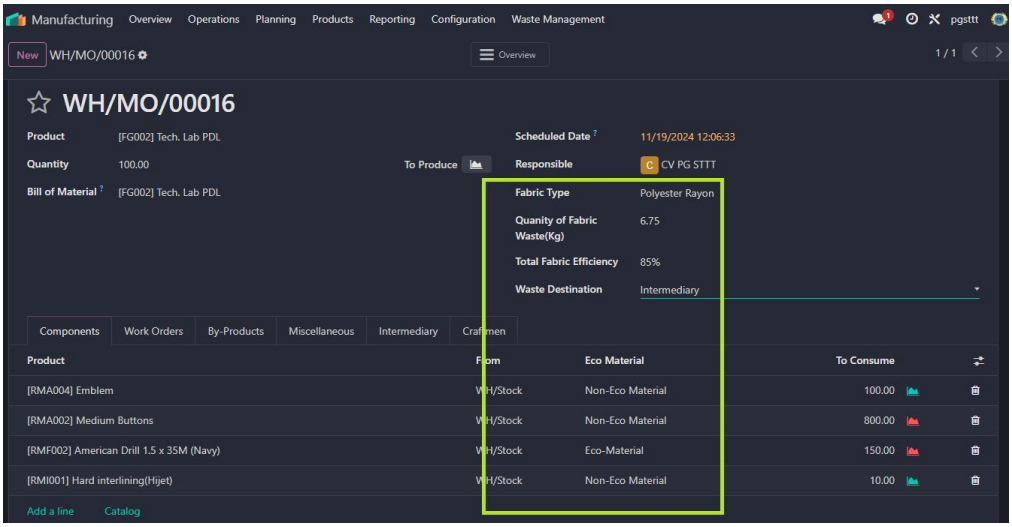

Figure 10 Manufacturing Order form for CV PG STTT

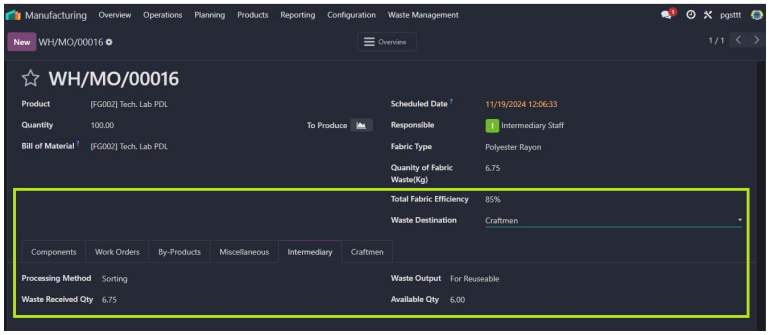

Figure 11 Manufacturing Order Form for Intermediary

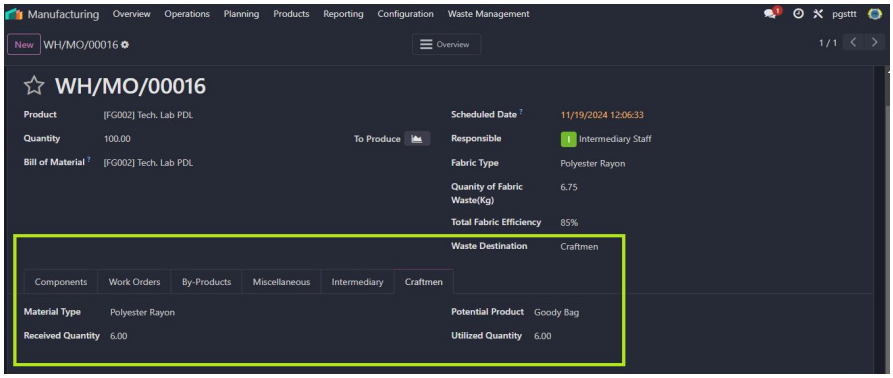

Figure 12 Manufacturing Order Form for Craftmen

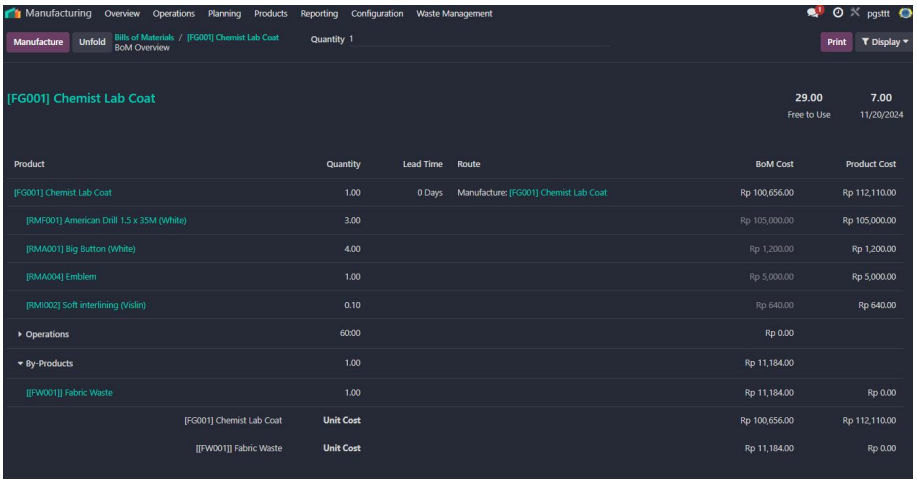

Figure 13Manufacturing Overview

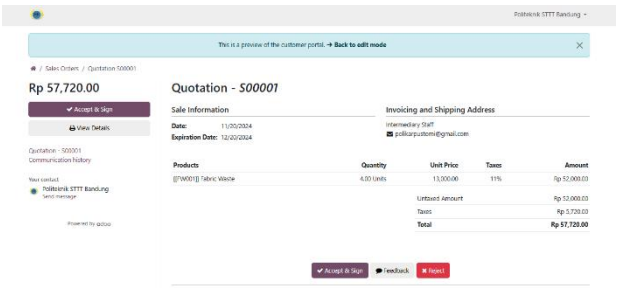

Figure 14 Sales Form of Fabric Waste