

Business Process Reengineering to Improve Supply Chain Management Through Implementation of ERP Odoo

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Abstract. This study aims to design an improvement in Supply Chain Management using the ERP Odoo application. This research starts with conducting field studies on the research object, designing the required system, prototyping, testing, and implementation. The methodology used is RND Borg and Gall Method approach to reach a suitable model in making business models for reengineering ERP implementation in small and medium enterprises. As a result, the business processes created using Odoo are way more efficient because all business activities can be integrated so that there is an automation of changing the working status of the product, so there is no need to check manually. Finally, testing has been done to see how well the system is.

Keywords: supply chain management, enterprise resource planning (ERP), Odoo, inventory system, manufacturing system

1. Introduction

In the midst of a digitalization transformation, Batik Semarang 16, one of the small and medium businesses with hundreds of motifs that elevate various regions and Semarang artifacts, has been registered with Intellectual Property Rights (IPR). Unfortunately, the business supply chain management is still done manually. This contradicts the statement that supply chain management is very important to help the company's performance be more effective and efficient. Internal and external process control can be carried out by ERP (Enterprise Resources Planning) [1]. ERP (Enterprise Resource Planning) is a software companies use to integrate and coordinate information in every business area. Integrating data generated by implementing an ERP system can speed up good process work in one department or across departments within a company [2]. This tool allows anyone to modify and distribute to anyone for any purpose and with a free and secure license [3]. Several ERP system providers exist, including SAP (Systems, Applications, Production in Data Processing). However, this research will use an ERP system called Odoo. Odoo's

flexibility is so advanced that applications can be added based on the growth and needs of the company one by one as the customer base grows and the needs of the company grow. With a variety of applications owned, research on Batik Semarang 16 is considered to require several applications, such as sales, purchasing, inventory, and manufacturing. This is different from research on CV XYZ, which only uses manufacturing, purchasing, and accounting applications [4], [5]. In various problems faced by Batik Semarang 16, the main problem in recording inventory in the form of hundreds of motives turned out to bring ineffectiveness and efficiency in subsequent processes, such as in the process of ordering materials at vendors and recording orders that enter through online platforms and offline orders directly. Therefore, Batik Semarang 16 requires an integrated system to facilitate the entire process.

2. Research Method

2.1 Research Approach

a. Research Approach

This study uses the RND Borg and Gall Method approach to reach the right model in making business models for reengineering ERP implementation in small and medium enterprises.

b. Research Location

The research was conducted at the Batik Semarang 16

c. The type of data used in this study is primary data.

2.2 Research Design

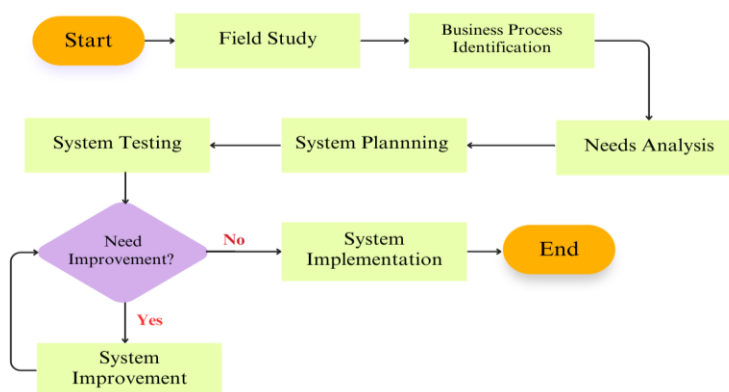


Figure 1. Research Design

2.2.1 Field Study

As shown in Figure 1, the first stage of the research team is to identify the problem through field studies by conducting observation and interviews. This activity was carried out to obtain the data needed during the research to find potential problems in batik center partners.

2.2.2 Business Process Identification

The next stage is to map the business processes carried out by Batik Semarang 16. Business processes were identified by following the flow of information, products, and money, including preparing raw materials, producing, and delivering products to customers. This is called AS IS (existing business process) analysis at Batik Semarang 16.

2.2.3 Needs Analysis

From the identification of business processes, researchers analyzed the results of Batik Semarang 16 to obtain findings of improvement in addition to / or development of systems that currently can support existing business processes with more leverage in the future.

2.2.4 System Planning

The system planning process is based on the needs analysis conducted in the previous stage. The system designed will be adapted to the Odoo system used in this study to adjust between the needs and availability of features in the Odoo system to produce a working system that can streamline business processes in Batik Semarang 16 in the future.

2.2.5 System Testing

In this stage, the results of the Odoo system that have been made were tested. This stage was to evaluate the system to determine if shortcomings must be corrected to finally produce a system that passed the test and met the needs of Batik Semarang 16.

2.2.6 System Improvement

After the system testing stage, system improvement was carried out if parts needed to be improved or less than optimal. Through this stage, it is expected that there will be a more applicable system development to meet the needs of Batik Semarang 16.

2.2.7 System Implementation

The results of the system that have gone through improvement and development began to be applied daily to Batik Semarang 16, starting from ordering at vendors to recording the production of Batik Semarang 16.

3. Result

This research proposes four business process reengineering flowcharts, as in Figures 2, 4, 7, and 9.

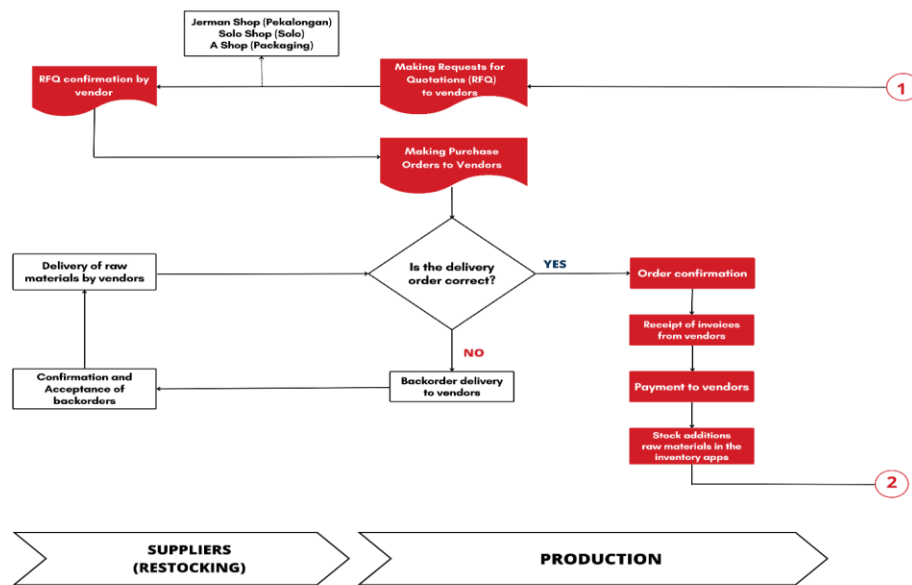


Figure 2. Business Process Reengineering 1

The first flowchart, as shown in Figure 2, illustrates the steps in placing orders with vendors. The steps that are usually done manually with communication patterns that have not been integrated through the system can now be done automatically through Odoo in the purchase apps, considering the identity and vendor contact with Odoo. Purchasing plays an important role in today's business as it involves developing sources of supply, ordering, obtaining materials at the right time, and value analysis, as well as effecting the disposal of surplus and scrapes [6]. Therefore, good and systematic purchasing management needs to be established and maintained using purchase apps in Odoo. The data in this purchase app is integrated with the inventory app so that the stock of raw materials increases automatically.

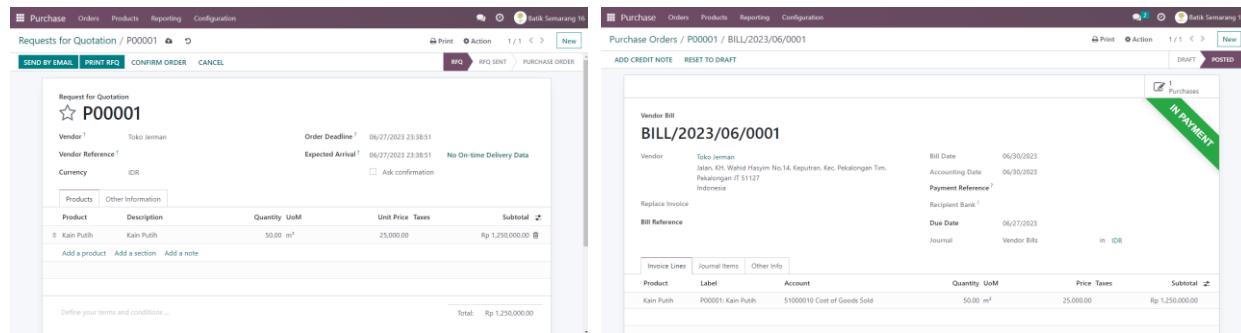


Figure 3. Request for Quotation at Purchase App

Figure 3, as displayed above, shows when Batik Semarang requests a quotation from the vendor. There are various details, such as the vendor chosen, the choice of products, and the total price to be paid. Downstream of various processes after this order for quotation is the successful payment to the vendor so that the delivery and receipt of raw materials can be done to increase the existing stock later.

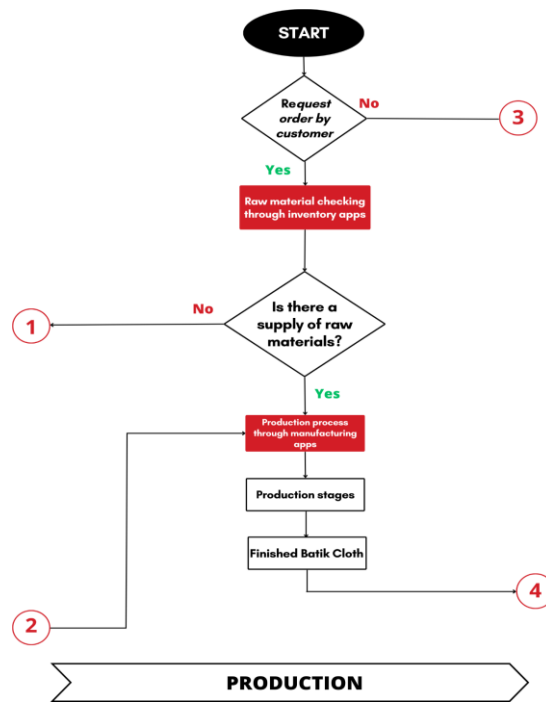


Figure 4. Business Process Reengineering 2

The flowchart in Figure 4 illustrates the beginning of the business process at Batik Semarang 16. It begins with a request order from a customer and then the raw material inventory checking in the inventory app. Inventory management plays a crucial role in the supply chain by maintaining optimal inventory levels aligned with order volumes to meet demand during product sales periods, with ongoing discoveries of sophisticated technologies and computational algorithms and the innovative application of traditional analytical techniques, presenting diverse opportunities for modern organizations [7], [8]. Hence, inventory apps in Odoo are a modernization of sophisticated inventory management that makes work more effective and easier.

Product	Unit Cost	Total Value	On Hand	Free to Use	Incoming	Outgoing	U...
Batik Motif As...	Rp 0.00	Rp 0.00	5.00	5.00	0.00	0.00	Units
Batik Motif As...	Rp 0.00	Rp 0.00	1.00	1.00	0.00	0.00	Units
Batik Motif As...	Rp 0.00	Rp 0.00	1.00	1.00	0.00	0.00	Units
Batik Motif As...	Rp 0.00	Rp 0.00	5.00	5.00	0.00	0.00	Units
Batik Motif As...	Rp 0.00	Rp 0.00	1.00	1.00	0.00	0.00	Units
Batik Motif As...	Rp 0.00	Rp 0.00	1.00	1.00	0.00	0.00	Units
Batik Motif Pe...	Rp 0.00	Rp 0.00	2.00	2.00	0.00	0.00	Units
Batik Motif Pe...	Rp 0.00	Rp 0.00	3.00	3.00	0.00	0.00	Units
Batik Motif Pe...	Rp 0.00	Rp 0.00	3.00	3.00	0.00	0.00	Units
Batik Motif Pe...	Rp 0.00	Rp 0.00	1.00	1.00	0.00	0.00	Units
Batik Motif Pe...	Rp 0.00	Rp 0.00	1.00	1.00	0.00	0.00	Units
Batik Motif Pe...	Rp 0.00	Rp 0.00	2.00	2.00	0.00	0.00	Units
Batik Motif Pe...	Rp 0.00	Rp 0.00	1.00	1.00	0.00	0.00	Units
Batik Motif Tu...	Rp 0.00	Rp 0.00	5.00	5.00	0.00	0.00	Units
Batik Motif Tu...	Rp 0.00	Rp 0.00	1.00	1.00	0.00	0.00	Units

Figure 5. Inventory Stock checking at Inventory App

Through the inventory apps, as seen in Figure 5, products and their quantities can be monitored. Existing quantities are automatically listed because they are integrated with the purchase app; inventory quantities can be changed manually as well. Furthermore, if the supply of raw materials is sufficient for the production process, it will proceed to the product manufacturing process in the manufacturing app. The manufacturing menu is used to create efficiency and effectiveness in the production process [9].

Product	To Consume	UoM
Kain Putih	6.00	m ²
Cat Warna Kain	150.00	g
Malam	0.90	kg
Soda Abu	0.12	kg

Figure 6. Manufacturing Orders at Manufacturing App

By entering the product name, the production capacity, and the input bill of materials that was previously created, the production process is recorded on the Odoo system through this manufacturing app (Figure 6).

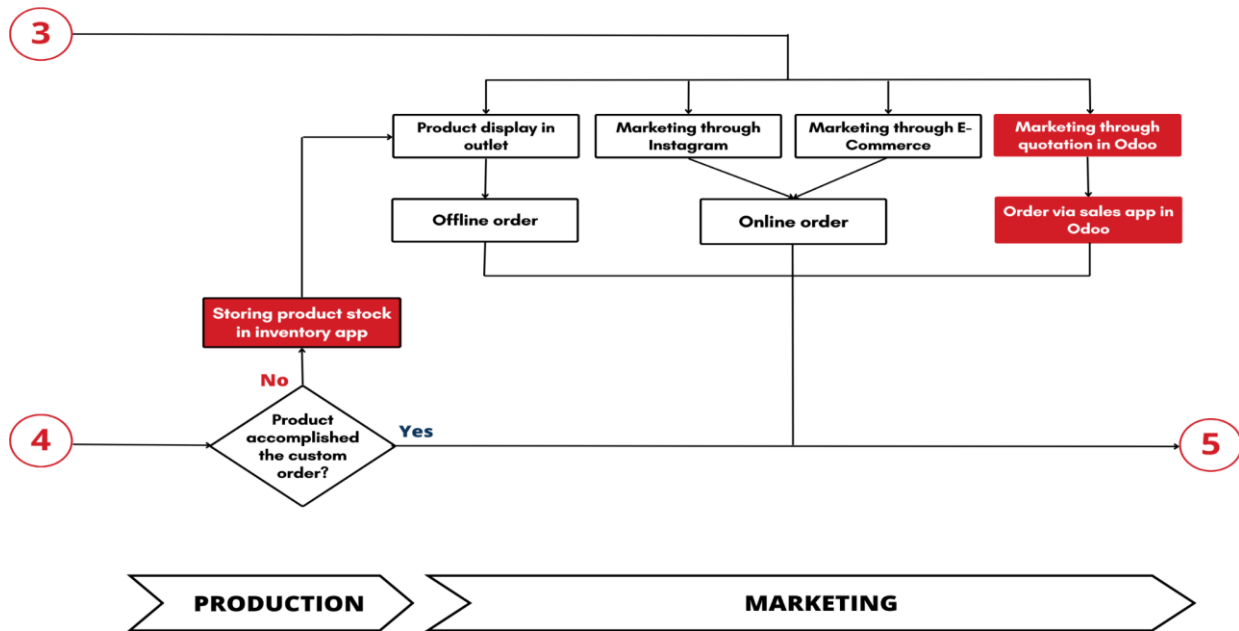


Figure 7. Business Process Reengineering 3

Figure 7 illustrates that products that have been produced and that do not fulfill customer orders will be stored and recorded in the inventory app section.

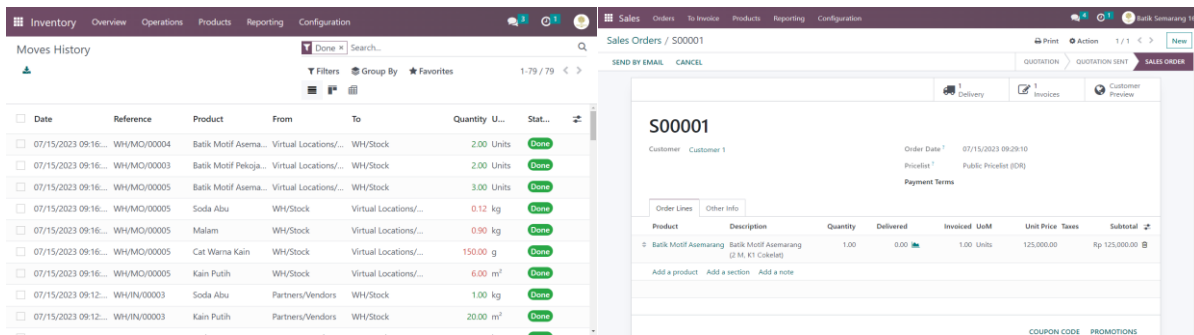


Figure 8. The product automatically increases in the Inventory App

Figure 8 shows that, in the inventory system above, there is an increase in product inventory, which automatically reduces raw material inventory due to manufacturing activities. The products that are not made to fulfill the custom order will be forwarded to marketing activities. Marketing can use Odoo to send quotations to customers. If the customer agrees, the customer will place orders through the sales app. The sales order will appear when the customer has approved the quotation, and then they place an order through the sales app.

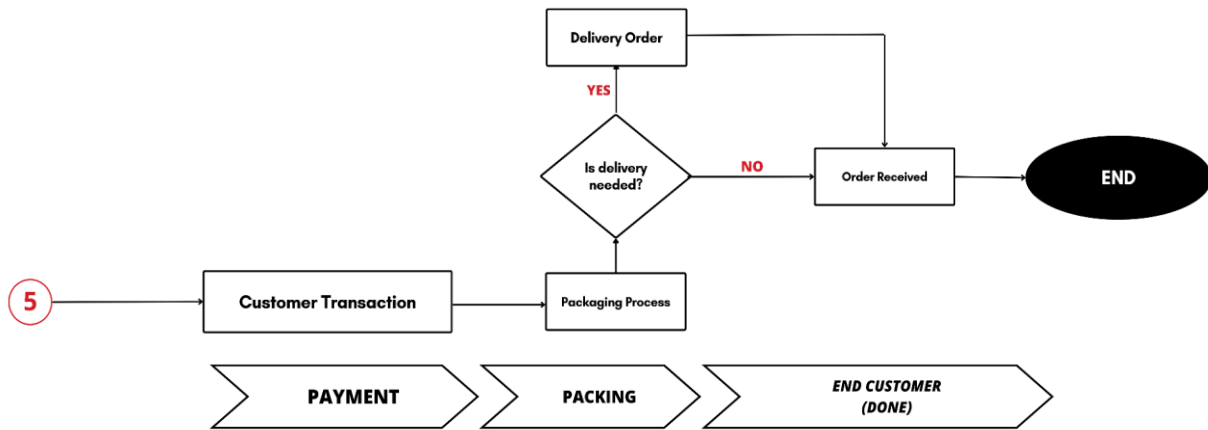


Figure 9. Business Process Reengineering 4

The process on the flowchart shown in Figure 9 involves payment for products ordered by the customer and the packaging process by Batik Semarang 16. When the two processes are completed, the product will be sent through delivery or direct receipt by the customer if the customer purchases directly at the Gallery of Batik Semarang 16.

Table 1. Gap Analysis

No	Business Process	Needs	Fulfillment			Information	
			N	P	F	AS IS (Existing Business Process)	ERP Odoo System (Business Process Reengineering)
1.	Vendor Records	Have raw material vendor data, which includes product information data, prices, and specifications			√	Employee must record the vendor data manually in MS Excel	Recording vendor data through Odoo in the Purchase apps, this makes it easier for companies to check and access product information, prices, and specifications more quickly and efficiently.
2.	Purchase	Purchase raw materials from vendors automatically when raw material supplies run out			√	Employee must check the stock in the warehouse and order manually	Purchasing raw materials from vendors will be easier because they have automatically gone through the Purchase and Inventory apps.
		The need to store raw material purchase transactions with vendors			√	Employee must record manually in MS Excel	Through the Purchase apps, all raw material purchase transaction data to vendors will be recorded and automatically stored accurately.
		Update stock in inventory			√	Employee must write to the record book the name of the item and the amount of stock available.	Warehouse updates will automatically go through the Purchase and Inventory apps.
3.	Manufacturing process	Easier way to start production process			√	Must check manually the quantities of raw materials and list the materials needed.	Existing quantities are automatically listed by Odoo because, when integrated with the purchase app, inventory quantities can be changed manually as well.

No	Business Process	Needs	Fulfillment			Information	
			N	P	F	AS IS (Existing Business Process)	ERP Odoo System (Business Process Reengineering)
4.	Sales to customer	Stock checking			√	Check the availability of stock manually in the warehouse	Check stock availability by opening the Inventory application which is updated automatically every time there is a sale.
		Offering to customers			√	Create offers manually to customers	Make offers using the Sales app by sending quotations to customers, and if the customer agrees, then the customer will place orders through the sales app.

Gap analysis is designed to measure the difference between the actual situation and the previously desired or expected situation, as well as to determine the level of achievement of the desired results and to help design actions and strategies aimed at achieving these goals. Although gap analysis is important in the implementation process, it also depends heavily on assessment analysis and significant efforts in the implementation process [10]. N (No Fit) means the system does not meet the needs. P (Partial) means the system satisfies necessity, but only partially. F (Full) means the system meets the needs of the whole [11]. Table 1 below shows the gap analysis of this study.

4. Discussion

The difference between this research and previous research is that CV XYZ only used manufacturing, purchasing, and accounting applications [4]. Meanwhile, this study used the sales, inventory, manufacturing, and purchase applications to facilitate the integration of business activity processes in a coherent manner at Batik Semarang 16, starting from purchasing raw materials and arranging inventory stock to offering to customers. All applications in Odoo that have been installed can be integrated directly [12].

The implementation of Enterprise Resource Planning (ERP) system automation via Odoo represents a step that can significantly increase the effectiveness and efficiency of business processes and solve problems that exist in Batik Semarang 16. Leveraging various Odoo applications, such as Purchase, Inventory, Sales, and Manufacturing, facilitates the streamlining of key business processes in Small and Medium Enterprises (SMEs). The system design process that is implemented is based on an approach to the Kaizen concept or continuous improvement to achieve company needs/goals [13], [14]. This transition replaces manual systems that existed before, which initially used a manual system (manual recording), and even in some processes, there was no precise data collection, especially in the Inventory section. These applications are automatically and tightly integrated with each other so that it will save time and energy because there is no need to repeatedly check each section.

All processes that have been carried out are well recorded. In the future, the data can be used as archives in calculating the number of products sold automatically so that Batik Semarang 16 can forecast the demand and supply more effectively. Moreover, other analyses like financial evaluation can also be done with these results to replace and determine prices for innovations that will be carried out in the future. Digitization processes in companies/organizations will be able to increase sales, build relationships with customers, and make business processes efficient [15], [16], [17].

Despite the automation of the supply chain process in Batik Semarang 16, there are still limitations in this study. The implementation of Odoo needs to be developed regularly to use other applications that may be needed in the advanced processes of Batik Semarang 16 in the future. Therefore, all business processes are perfectly integrated and balanced with adequate human resources to operate using Odoo.

5. Conclusion

This first phase of this research has led to the conclusion that the system and application design was done correctly and met the potential users' needs and problems. Using Odoo to improve the supply chain management and inventory system in Batik Semarang 16 is the right solution, that the record is not done manually anymore. Besides that, all business processes can also be integrated, making all stages more effective and efficient. The result of this study shows how Odoo provides convenience in automating business processes, from purchasing raw materials to vendors and updating stock, manufacturing, and sales to the customer by quotation.

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