

## PROCUREMENT BUSINESS PROCESS REENGINEERING IN MANUFACTURING COMPANIES USING BUSINESS PROCESS ANALYSIS METHODS

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**Abstract**— The high increase in business competition enables many organizations in any field to run their business more quickly and effectively to achieve business goals. Business processes are activities carried out by organizations to achieve organizational goals. In manufacturing companies, procurement is one of the central business processes of the organization. Therefore, in this study, an analysis of the procurement business process was carried out and then designed a more optimal targeting business process engineering for the organization. Business process engineering is carried out by analyzing business processes using value-added analysis, flow analysis and simulation methods. The results of business process engineering show that targeting business processes that are prepared is better in terms of time and costs compared to existing business processes.

**Keywords:** Business Process Reengineering, Valued Added Analysis, Simulation, Flow Analysis.

**Abstrak**— Persaingan bisnis yang semakin tinggi membuat banyak organisasi dibidang apapun untuk dapat lebih cepat dan efektif dalam menjalankan bisnisnya untuk mencapai tujuan bisnis. Proses bisnis merupakan serangkaian aktivitas yang dilakukan oleh organisasi untuk mencapai tujuan organisasi, pada perusahaan manufaktur proses bisnis pengadaan merupakan salah satu proses bisnis utama organisasi. Oleh sebab itu, pada penelitian ini dilakukan analisa proses bisnis pengadaan kemudian merancang rekayasa proses bisnis targeting yang lebih optimal bagi organisasi. Rekayasa proses bisnis dilakukan dengan melakukan analisa proses bisnis dengan menggunakan metode valued added analysis, flow analysis dan simulasi. Hasil rekayasa proses bisnis menunjukkan proses bisnis targeting yang disusun lebih baik dari sisi waktu dan biaya yang dikeluarkan dibandingkan dengan proses bisnis existing.

**Kata Kunci:** Rekayasa Proses Bisnis, Analisa Valued Added, Simulasi, Analisa flow

### INTRODUCTION

The market's growth became competitive, and business competition became more complex and tight, creating new challenges for the company. The speed of information acquisition and evaluations must be considered in a company. Another thing that needs to be considered is how quickly the company use the information to tackle accident or problems met by the company. Therefore, speed became one factor needed by a company or organization to grow its competitive advantages. The main problem met by companies is a delay in problems and accident responses. (Marquez et al., 2014)(Cespedes, 2018).

Companies or organizations must have a good and well-organized business process to tackle these problems and gain competitive advantages. A business Process is a group of structured activities linked to each other to solve particular problems or produce specific products or services (Cespedes, 2018)(Tehraninasr & Darani, 2009). A rigorous analysis is needed to make an effective and efficient business process. Because with the proper analysis, we could find the required activities by the company or organization.

PT.XYZ is a fashion manufacturing company in Bandung. One of the primary business processes in their organization is the procurement process. Currently, the activities in the procurement process require a relatively long time to complete one cycle of the procurement process. On the other hand, technology investments have also been made to help accelerate the process but have not been used optimally. Optimization of technology and processes is expected to provide added value to the organization's business. Therefore, in this research, we will analyze existing business processes and

optimize them, enhancing the organization's performance towards its goals.

### MATERIALS AND METHODS

This research used a mixed-method methodology. The mixed-method methodology combines quantitative and qualitative methods in conducting research (Sugiyono, 2018). The data was gathered using interviews, expert judgment, and company service-level agreement documents. We run the data analysis step using Bizagi as the tool for the value-added analysis, Flow Analysis, and Simulation (Ng et al., 2013; Vergidis et al., 2008) (Risnenti et al., 2022)(Qin et al., 2021). The business process quality indicator used in this research include human resources and time (Lankhorst, 2013). The main focus of this research is the raw materials and service procurement process at PT XYZ, which has focused on shoe manufacturing and selling since 2006 in Bandung.

This research's primary process includes observation, problem identification, problem statement, solution analysis, business process engineering, recommendation creation, result and discussion, and summary development.

In the observation process, we observe the process of the raw materials procurement activity in the business process and the methodology in business process analysis. In the problem identification and statement, we decide on the variable used in the research and formulate the problems into a problem statement. In the solution analysis, we analyze the precise parameters to conduct the business process engineering and analyze the current business process.

The new business process was created through the business process engineering designed using a

value-added approach. The value-added approach analyzes the activity in the process by categorizing each activity into three value-added categories, business value-added and non-value-added (Ng et al., 2013)(Immawan et al., 2018)(Islam & Cerny, 2021).

Procurement business process recommendations are created using the current business process analysis. The result and discussion include the simulation result comparison between the current business process and the proposed business process developed from this research which a summary was taken.

### RESULTS AND DISCUSSION

Based on the results of expert judgment analysis and interviews of the existing activities in the procurement business process, six activities have the NVA category and ten activities in the BVA category. Details of the analysis of each activity can be seen in table 1.

The procurement business process consists of several activities, and actors run it. From the existing process, we map and categorize each category's value-added. The value-added categories are divided into two categories which are Non-Value-Added (NVA) and Business Value-Added (BVA). NVA is an activity that has no impact on the organization or company. On the other hand, BVA is the activities that add value to a company or organization.

Based on the analysis process and expert judgment, we found that in the procurement process, six processes were categorized as NVA and ten activities were categorized as BVA. The details of the process can be seen in Table 1.

Table 1. Procurement Business Process Qualitative Analysis

No	Activities	Activities Classification	Activity Analysis
1	Developing Procurement Documents	BVA	A procurement Document is needed to ease the raw material order. Therefore this process is categorized as BVA because it could ease the following process.
2	<i>Contacting Supplier</i>	BVA	This activity is a group of activities closely connected with other activities and successful business processes.
3	Receiving Contacts from Warehouse Staff.	NVA	This activity was erased because in the contacting supplier activity, most certainly been contacted the warehouse staff
4	Receiving Order	NVA	Receiving orders can be automated
5	Preparing order	BVA	Preparing orders to satisfy the order activity and give added value to the company
6	Send order to Warehouse	BVA	This activity needed to complete the order

No	Activities	Activities Classification	Activity Analysis
7	Conduct Payment	BVA	Vital activity in procurement activity. Without this activity, the order cannot be completed
8	<i>Raw materials confirmation to the supplier</i>	BVA	Confirmation is conducted to ensure raw materials fulfilment according to the order.
9	Receiving Raw materials and loading raw materials	BVA	Order fulfilment happened in this process. Therefore, this is vital activity or process
10	Supplier receives payments	NVA	The payment receive activity can be automated
11	Raw materials restocking and creating an availability list	BVA	This activity is helpful for information flow within the company. The information about stock availability influences the company's business processes.
12	Receive raw materials availability information	NVA	informasi yang di dapat. This activity can be deleted from the process because the availability should be a default activity.
13	We are sending lists of required raw materials.	BVA	Without raw materials, production can occur. Therefore procurement process became the primary process
14	Receiving required raw materials information	NVA	This activity can be automated using an information system
15	Sending raw materials	BVA	the raw materials are essential to continue the company's following business process and ensure it runs smoothly
16	Receive raw materials	NVA	This activity can be automated using an information system

For the activity categorized as NVA, based on the initial analysis, we need to conduct a follow-up analysis to redesign the business process. Therefore the business process can be optimized and become more efficient. The analysis was conducted, looking for the possibility of redesigning each business

process. The business process labelled or categorized as "*possibly possible*." is the activities that can be eliminated because its already accommodated and optimized. The detail of the activity can be seen in Table 2.

Table 2. Procurement business process redesign analysis

Aktivitas	Alasan Redesign	Possibility
Receiving Contacts from Warehouse Staff	This activity eliminates because the supplier should receive the contact by default.	Possible
Receive Order	This activity can be automated using an information system	Possible
<i>Raw materials confirmation to supplier</i>	This activity can be automated using an information system using a notification feature	Possible
Receive raw materials availability list	This activity can be automated using an information system using a notification feature	Possible
Receive required raw materials information	This activity can be automated using an information system using a notification feature	Possible
Raw materials received	This activity can be automated using an information system using a notification feature	Possible

Source: (Immawan et al., 2018; Tehraninasr & Darani, 2009; Vilasdechanon & Sopadang, 2018)

After eliminating the company's non-impactful procurement business process activities, we

conduct a business process simulation on Bizagi, as seen in Table 3. The business process is viewed

from three aspects: cost, time, quality, and flexibility—the cost and time data achieved from the service level agreement document legalized by the company.

Table 3. Procurement Process Performance Analysis

No	Aktivitas redesign	Cost	Time	Quality	Flexibility	Explanation
1	Develop procurement document	+	+	+	+	Each aspect (+) because it supported by a system
2	Contacting supplier	-	-	+	.	<i>Cost and time got (-) because there was some cost in communication fees or other kinds of costs. The Quality aspect got (+) because each company supplier has a working contract and is hand-picked by the company to ensure quality.</i>
3	Preparing Order	+	.	+	+	Cost, quality, and flexibility got (+) because each supplier has to provide the best raw materials that comply with the quality standard, affect flexibility, and match the cost. Whereas the Time aspect got (.) because it already has the agreement, therefore it can be (+) or (-)
4	We are sending orders to warehouse staff.	-	-	.	-	Cost and time got (-) because there were possibilities of added cost. For example, the gas price goes up freeway or another unplanned expense. At the same time, the flexibility and quality got (.) because of its unpredictability.
5	conduct payments	.	.	.	.	Conduct payments got (.) for all aspects because it is a necessary process.
6	Receive and load the raw materials	.	-	+	.	Cost and flexibility got (.) because it does not need cash and does not have any flexibility. The time aspect also got (.) because the time required is related to the quantity of the raw material. The quality aspects got (+) because the raw materials' quality needs to be preserved when stored.
7	Renew raw material stock and raw materials availability list.	+	+	+	+	Every aspect got (+) because the system assists it.
8	Send the list of raw materials required for production	+	+	+	+	Every aspect got (+) because the system assists it.
9	Mengirim bahan baku Send the raw materials	.	.	+	+	<i>Cost and time got (.) because it is not neutral. Flexibility and quality got (+) because the raw materials sent as requested made it more flexible and ensured the quality of the raw materials loaded in the Warehouse.</i>

The existing business processes eliminated and redesigned are the targeted business processes that will be analyzed to see the practical difference between the current and recommended business processes.

The business process simulation viewed one business process cycle's cost and time parameters. The result of the simulation can be seen in Table 4 and Table 5.

Table 4. Resource existing proses pengadaan

Resource	Utilization	Total fixed cost	Total unit cost	Total cost
Warehouse staff	0,46%	1,491,42	2,319,99	3,811,41
Production Staff	0,11%	745,71	1,035,71	1,781,42
Raw material	0,66%	319,59	2,130,6	2,450,19
manager supplier	22,37%	1,988,56	83,743,23	85,731,79
Total		4,545,28	89,229,53	93,774,81

Table 5. Procurement Resource Targeting

Resource	Utilization	Total fixed cost	Total unit cost	Total cost
Warehouse Staff	0,73%	1,242,85	0	1,242,85
Production Staff	0,07%	248,57	0	248,57
Raw Materials	0,25%	319,59	0	319,59
Manager Supplier	48,55%	994,28	0	994,28

Table 6. Time Comparison between current business process and Target

Business Process	Min. time	Max. time	Avg. time
Existing procurement business process	2d 2h 12m	2d 2h 12m	2d 2h 12m
Target Procurement Business Process	2d 1h 26m	2d 1h 26m	2d 1h 26m

Table 7. Performance Comparisson

Performance Analysis Result (existing)	System Simulation Result (Target)
Cost: \$ 30.62	Cost: \$ 19.72
Quality: -	Quality: +
Time: 2d2h12m	Time: 2d1h16m
Flexibility: -	Flexibility: -

The result, calculation, and simulation of the current and target business process analysis show that the targeted business analysis performed better than the existing business process from cost, time, and quality aspects, as shown in Tables 6 and 7. Because in the target business process, we use information systems to assist and replace some processes. The utilization of information systems made the procurement process have fewer activities. Therefore the company could save costs and time. Consequently, the quality and flexibility of the target business process are better.

### CONCLUSION

Existing Business process reengineering using value-added business process analysis, flow analysis, and simulation shows that the target business process is more optimal from the cost,

time, and quality aspects. The existing business process costs \$30.62 and takes 2 days 2 hours 12 minutes while the target business process costs \$19.72 and takes 2 days 1 hour 16 minutes to complete one process cycle. The recommendation to enhance the business process is the utilization of information systems and application design which we recommend in the target business process. Another suggestion for the company is to develop a better ordering mechanism or standard operating procedure for the reseller.

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