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Evaluation Business Process of *Songket* Industries in Indonesia to Increase Time Efficiency

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Abstract

This research seeks to assess the business processes within the *songket* industry, which has been notably affected by the COVID-19 pandemic. The industry encountered a dramatic decline in orders, leading to a significant drop in revenue alongside increased operational costs. In response, the industry adopted measures such as workforce reductions. Nevertheless, as conditions have started to improve, customer orders have resumed. Consequently, the industry is in need of a strategy for effectively managing customer demand with the current workforce levels. Steps have been taken to enhance internal processes aimed at reducing production time and facilitating subcontracting of orders to alleviate the situation; however, these initiatives have yet to produce the anticipated outcomes, thereby jeopardizing the sustainability of the industry due to inadequate income. The primary objective of this research is to effectively tackle these challenges. To accomplish this, the study focuses on identifying the optimal resources and critical production time required to satisfy customer demands and boost industry profitability. Utilizing iGrafx software for business process re-engineering, the research indicates improvements in process efficiency: Kain Betabur recorded an 8.68% increase in process time, Kain *Songket* Bunga Penuh saw a marginal increase of 0.29%, and Kain Beragi Penuh experienced a growth of 0.85%. These findings present a viable solution to the challenges faced by the industry, paving the way for sustainable growth and enhanced time performance.

Keywords
Business process re-engineering; Process map; Time efficiency; Time improvement, iGrafx software

1.Introduction

During the period of the Covid-19 pandemic, industries worldwide faced unprecedented challenges and difficulties (Fitri & Zuryani 2022; Nurnazmi et al. 2021). The impact was significant for industries, including essential and non-essential goods industries that primarily operated through conventional means (Johan G. Ony, 2021). The pandemic had a profound effect on these industries, leading to severe consequences (Salleh & Bushroa 2022). For essential goods industry, this effect was not profound because it was supported by Government such

as tax deduction (Nurnazmi et al. 2021). Otherwise for non-essential goods industry contributed to the difficulties faced such as layoffs, reduced purchasing power, and declining demand. (Johan G. 2021).

The *songket* industry, like many other industries, was significantly impacted by the pandemic (Feri et al. 2022). The focus of this research is *songket* industry in Air Hitam Village, Indonesia. This industry faced significant challenges and almost collapsed, struggling to survive (Fitri & Zuryani 2022). The impact of the pandemic led to a drastic reduction in the number of incoming orders, causing the industry to experience a sharp decline in its business. On average, the industry could only receive 1 order per month, which is significantly lower compared to the previous range of 5-7 orders per month. To cope with the reduced workload, the industry had to make difficult decisions, including reducing its workforce from 15 workers to just 3 workers.

However, once industry conditions have recovered, customers have resumed placing orders. The industry requires a strategy for managing customer demand even with the existing number of workers, which is only about 3 workers. The industry has taken steps to improve its internal processes with the goal of reducing production time. Additionally, the industry resorted to subcontracting some orders to external parties, despite the higher production costs associated with this strategy. As a result, the industry's profitability suffered, with a decrease in overall profits. Unfortunately, improve its internal processes and the adoption of subcontracting did not have a significant positive impact on the industry's situation. The challenges after the pandemic era and the subsequent adjustments made by the industry proved to be insufficient to overcome the difficulties faced. Industry still faced lengthy production times, inefficient workflows, and overlapping processes.

There are several tools and approaches that can help an industry in this situation such as Lean Manufacturing, Six Sigma, Process Automation, Kanban, Technology Integration, Training and Skill Development, Supply Chain Optimization, Performance Measurement System and Business Process Re-Engineering (Reda & Dvivedi 2022). Due to the limited resources in the industry, Business Process Re-Engineering can be an appropriate method to apply (Shivam & Gupta 2022). When resources are limited, Business Process Re-Engineering enables industry to identify innovative ways to accomplish tasks with fewer resources while still meeting customer needs and organizational goal (Pratiwi & Dachyar 2020; Shivam & Gupta 2022).

In light of the challenges and problems faced by the industry, it becomes crucial for the industry to undertake improvements to ensure its survival and competitiveness in the future (Tripathi & Gupta 2021). Recognizing the need for internal improvements, the main objective of this research is to enhance the industry's performance efficiency by developing a new business process. To achieve this objective, several research questions have been formulated:

(1) *What are the weaknesses of the current business process?* This question aims to identify and understand the existing limitations, bottlenecks, and inefficiencies in the current business process within the industry. By recognizing these weaknesses, the research can lay the foundation for designing and implementing improvements (Dachyar & Sanjiwo 2018).

(2) *What will be the new model business process?* This question focuses on developing a new model business process that addresses the weaknesses identified in the current process. It involves rethinking and redesigning the workflow, resource allocation, task assignments, and any other relevant elements to create a more effective and efficient process (Pattanayak & Roy 2015).

(3) *What is the significant outcome of performance in the industry?* This question seeks to determine the potential outcomes and impact of the improved business process on the industry's performance. It aims to quantify the positive outcomes that can be achieved through the implementation of the new process, such as increased productivity (Dele Awolusi & Sulaiman Atiku 2019).

Based on these research questions, the research aims to provide a comprehensive understanding of the weaknesses in the current business process, propose a new and optimized model process, and highlight the significant benefits that can be achieved through the performance improvements. The findings from this research can guide the industry in implementing changes that enhance operational efficiency, increase competitiveness, and drive long-term success (Ngozi Ezeonwumelu et al. 2016).

2. Methodology

2.1 Study Area

This research was conducted in a *songket* industry located in Air Hitam Village. Air Hitam Village is situated in the Batu Bara district in the province of North Sumatra, Indonesia. It is approximately 167 km away from Medan, which is the capital city of North Sumatra.The village has a diverse population consisting mainly of ethnic Malays,

Javanese, and Batak people. The ethnic Malays in Air Hitam Village primarily rely on *songket* weaving as their main source of income. *Songket* weaving is a traditional craft that holds cultural significance in the region, and the villagers have honed their skills in this art form over generations (Damanik et al. 2021). Fig. 1 showed Air Hitam Village on ArcGIS software.

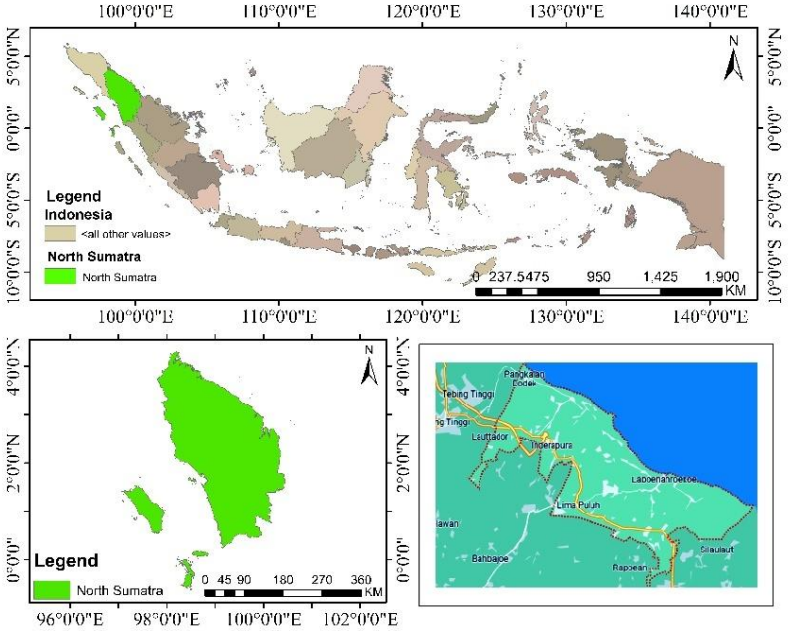

Figure 1. Location on ArcGIS Software

3. Material

In this research, input data such as data type of products, workflow, and process time were collected from the *songket* industry. The type of products is such as *Kain betabur* (x_1), *Kain songket bunga penuh* (x_2), and *Kain beragi tabur* (x_3). Data constrains also gathered from this industry such as workers (man-days) and machines (unit-days). Input data is described in Figure. 2 and Table. 1.

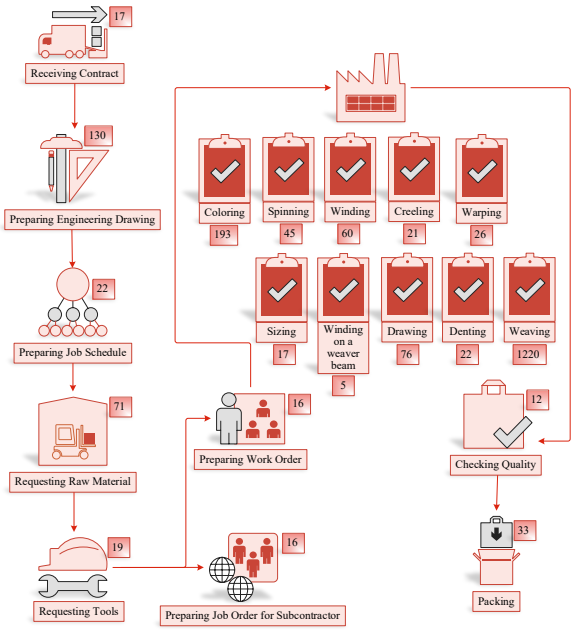

Figure 2. Workflow and process time

Table 1. Data as constrains

Product	Profit (IDR)	Simulated Process Time	Worker		Machines
			Daily	Skilled	
x_1	8,00,000	Based on prediction simulation result	4	1	3
x_2	9,50,000		5	2	3
x_3	6,00,000		3	1	2
Max		260	208	104	156

4. Research Methodology

Research Methodology of this research can be seen in Fig. 3.

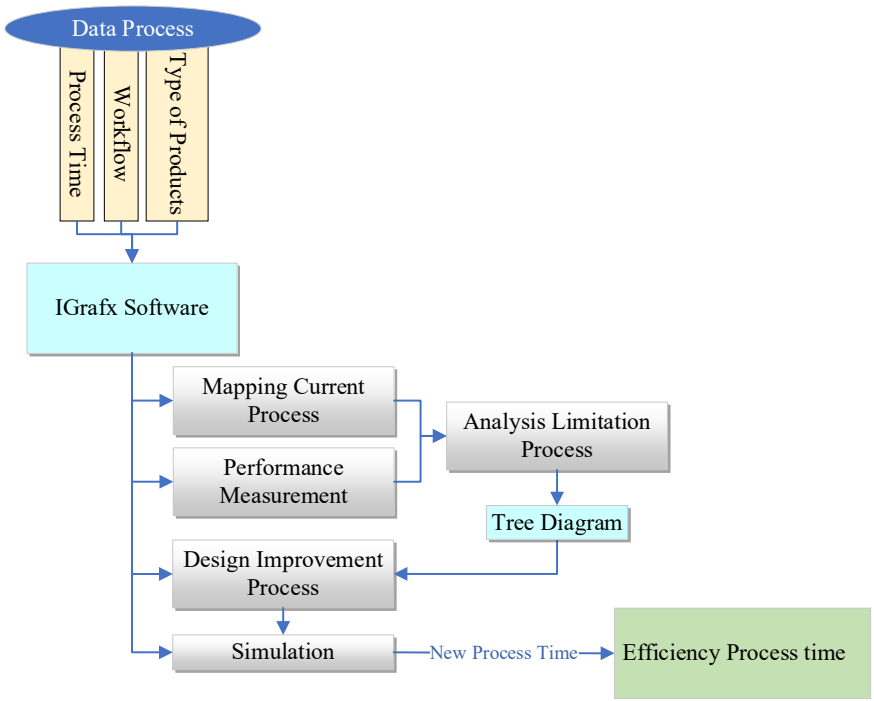

Figure 3. Research Methodology

This research involved are as follows:

1. Current Process Analysis:

   a. Mapping the current business process: This step involves documenting and visualizing the existing workflow, including activities, inputs, outputs, and dependencies. It provides a clear understanding of the current state of the process.

   b. Performance measurement of the current process: In this step, key performance is identified and measured to evaluate the efficiency and effectiveness of the current process. Performance measurement is conducted directly using a stopwatch. This includes measuring cycle time, and resource utilization.

   c. Analyzing limitations of the current process: This step focuses on identifying and analyzing the constraints and limitations of the current process. Process analysis and evaluation can be conducted using tree diagrams as a visual tool. It helps in identifying inefficiencies and areas for improvement.

2. Designing the Improvement Process:

   a. By addressing the analysis of the current process, a new and improved process is designed. This involves identifying areas where enhancements can be made to optimize efficiency and effectiveness.

   b. Simulation design involves using specialized software to simulate and model the proposed improvement process. This allows for testing and predicting the outcomes of the proposed changes before implementation. The primary objective of this simulation is to predict the cycle time needed for the process.

   c. Performance improvement initiatives are implemented to enhance the overall efficiency process. This can involve streamlining workflows and implementing best practices.

5. Result and Discussion

5.1 Identify Current Process

In this research, current process was identified based on process implementation and cycle time for three types of *songket*. The mapping is performed through Fig. 4. It visually represents the current process of this industry as a result of mapping.

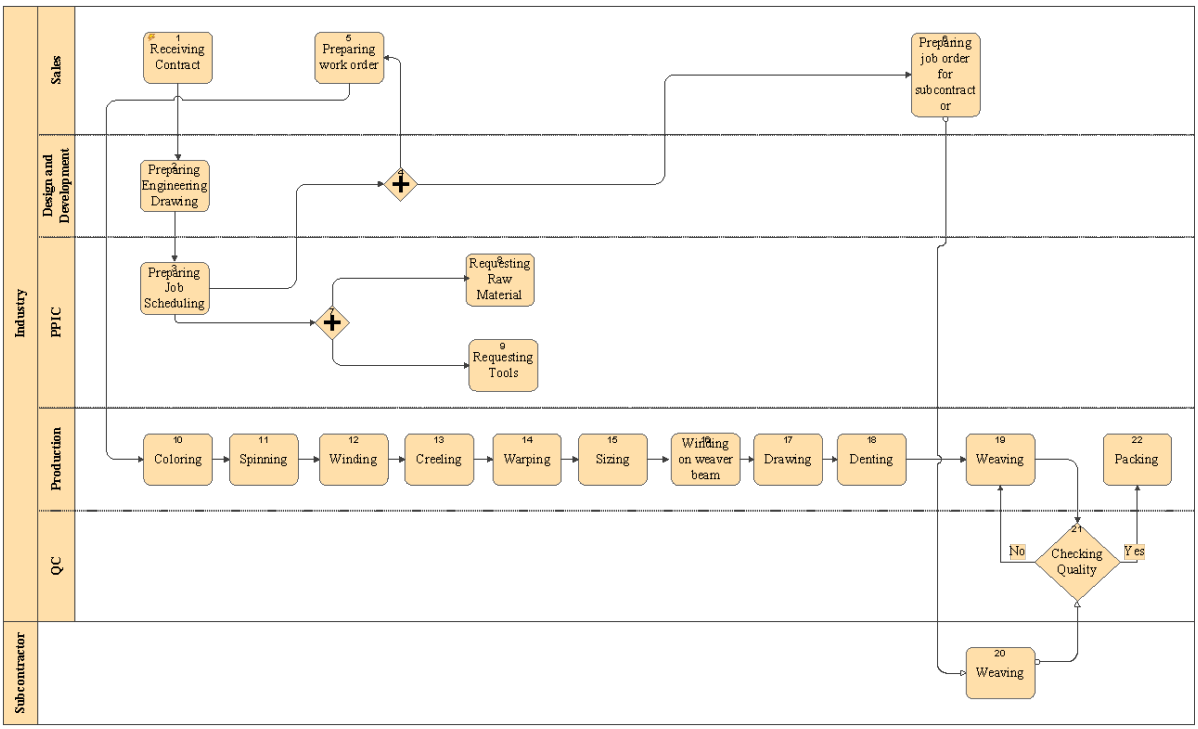

Figure 4. Current Process using iGrafx software

5.2 Performance Measurement

In this research, performance measurement is the measurement of various processes in the industry's value chain. The outcomes of these measurements are then used as feedback in terms of effective and efficient activities, providing information about the accomplishments of plan implementation and the point at which the industry has to take improvements to planning and control processes. Performance measurement using shown in Tab. 2 to Tab. 3.

Table 2. Process Time using Stopwatch

Product	Time
x_1	10 days 0 hour 20 minutes
x_2	10 days 2 hour 00 minutes
x_3	8 days 2 hour 00 minutes

Table 3. Process Time using iGrafx Software

Product	Avg. Cycle Time	Avg. Work Time	Avg. Wait Time
x_1	10.02	0.17	9.85
x_2	10.25	0.17	10.08
x_3	8.24	0.17	8.08

3.3 Analyze Limitations of the Current Process

Interviews with stakeholders and observations are conducted as the foundation for problem identification and understanding the challenges faced by the industry. The tree diagram is used to analyze break down complex problems into the primary causes or contributing factors. The first weakness identified was the involvement of sales personnel in administrative tasks. This indicates a potential inefficiency in the process, as sales staff should ideally be primarily focused on generating sales and building customer relationships. The second weakness identified was the lack of integrated scheduling. The scheduling of activities or resources within the process is not effectively coordinated or synchronized. Fig. 5, which is mentioned, likely illustrates the identified issues that the industry is currently facing.

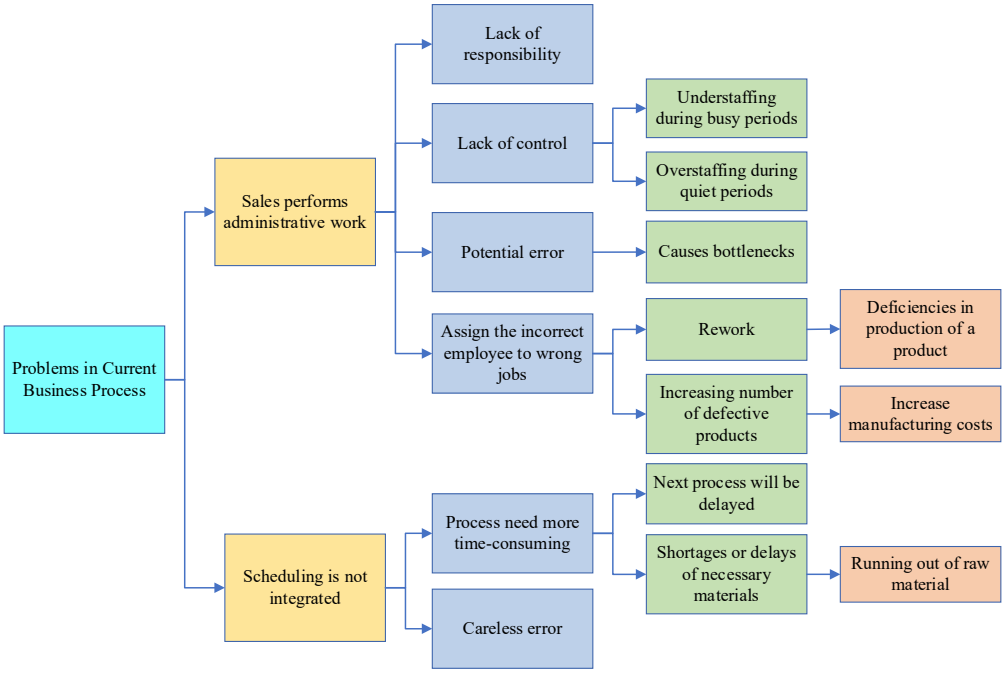

Figure 5. Analysis Current Process

3.4 Design Improvement Process

In this research, the focus was on conducting a design improvement process to address the limitations present in the current process. Two specific weaknesses were identified as areas for improvement: sales performing administration works and lack of integrated scheduling.The design improvement process aims to address first weakness by finding ways to streamline and optimize administrative tasks, allowing sales personnel to concentrate on their core responsibilities. And the design improvement process seeks to overcome second weakness by introducing an integrated scheduling system that facilitates better coordination and optimization of activities, ensuring smoother operations and improved overall efficiency. Fig. 6 shows that improvement of the process.

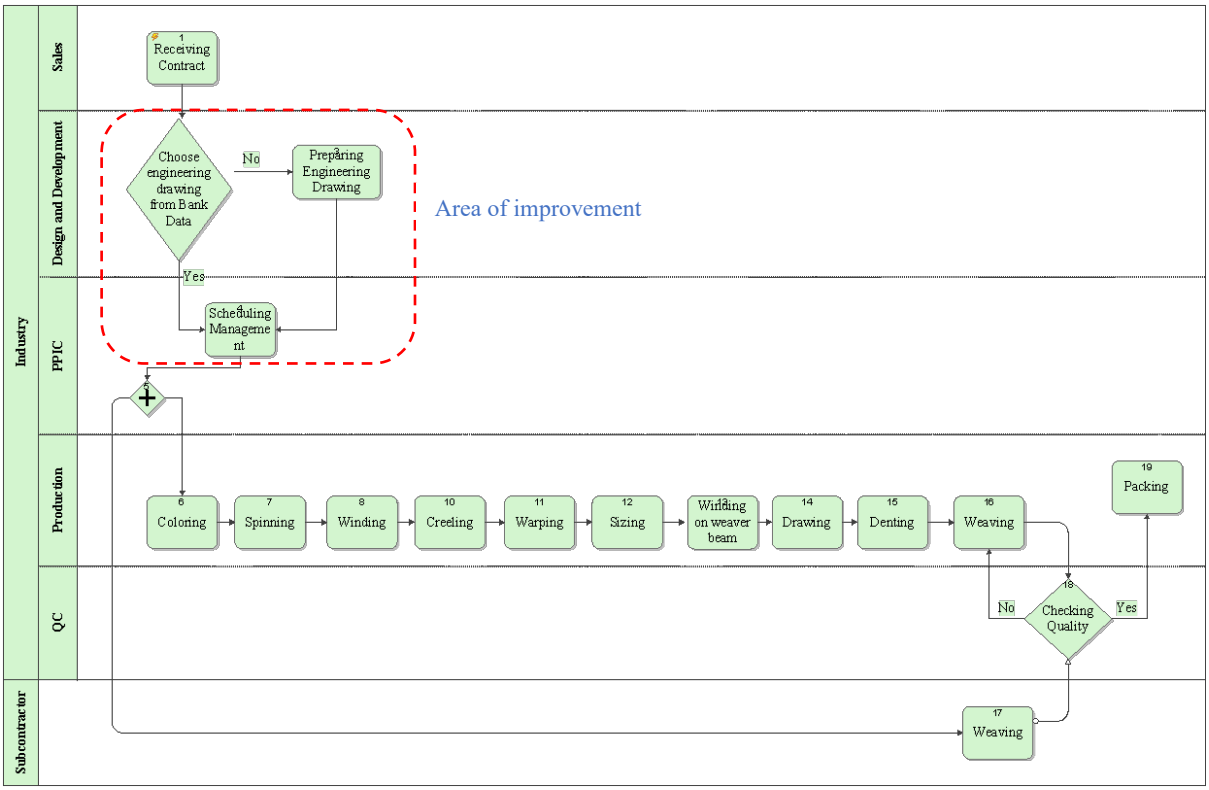

Figure 6. Improvement Process using iGrafx software

3.5 Simulation and Validation Design

In the described scenario, the purpose of this design simulation is to verify and validate the expected outcomes of a proposed system's development and assess its manufacturability within the industry. The simulation begins by setting the weekdays as the simulation period, starting from 8 am and ending at 17 pm. During this time, varying demands are considered, reflecting the dynamic nature of the industry. The simulation captures the transactional activities and processes involved in the proposed system. The simulation continues until all the transactions are completed, indicating the completion of the modeled processes. Notably, no warm-up time is considered, meaning that the simulation starts immediately without any initial period of stabilization or adjustment. The simulation result showed at Tab. 4 to Tab. 6.

Table 4. Recap Simulation Result Product x_1 (days)

Process	Avg Cycle Time	Avg Work Time	Avg Wait Time
Main Process	9.15	1.14	8.01

Table 5. Recap Simulation Result Product x_2 (days)

Process	Avg Cycle Time	Avg Work Time	Avg Wait Time
Main Process	10.22	1.30	8.91

Table 6. Recap Simulation Result Product x_3 (days)

Process	Avg Cycle Time	Avg Work Time	Avg Wait Time
Main Process	8.17	0.98	7.18

3.6 Performance Improvement

In this research, performance improvement to measure the output of a certain business process and then improving it to increase production, efficiency, or effectiveness. Table 7 likely presents a comparison of efficiency measures before and after the improvement process. This table provides a quantitative assessment of the process's performance, demonstrating the impact of the implemented improvements on efficiency.

Table 7. Efficiency Process Time

Product	Processes	Avg Cycle Time	Avg Work Time	Avg Wait Time	Efficiency
x_1	Before	10.02	0.17	9.85	
	After	9.15	1.14	8.01	8.68%
x_2	Before	10.25	0.17	10.08	
	After	10.22	1.30	8.91	0.29%
x_3	Before	8.24	0.17	8.08	
	After	8.17	0.98	7.18	0.85%

4. Conclusion

Industry around the world experienced extraordinary issues and problems During the Covid-19 pandemic. The pandemic had an enormous effect on the *songket* industry, as it did on many other industries. The industry witnessed a sharp decline in orders, leading to a substantial decrease in income and increased expenses. Measures like worker reduction were implemented during the crisis, and while customers resumed placing orders as conditions improved, the industry still needed a strategy to effectively manage customer demand with the existing workforce. Despite efforts to improve internal processes and subcontract orders, the desired results were not achieved.

Industry should do identifying optimal resources and critical production times to meet customer demands and enhance industry profitability. Utilizing iGrafx software for business process re-engineering, the study revealed improvements in process efficiency, such as Kain Betabur achieved an increase of 8.68% in process time, Kain *Songket* Bunga Penuh experienced a slight increase of 0.29%, and Kain Beragi Penuh saw an increase of 0.85%. These findings offer a viable solution to the challenges the industry faced, paving the way for sustainable growth and improved financial performance.In summary, the research highlights the weaknesses in the current business process and proposes potential improvements that can lead to increased efficiency, reduced cycle time, and higher profits. The findings provide valuable insights for optimizing the production process of *songket*.

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