

Business Process Analysis and Modelling Using the Business Process Model Notation (BPMN) Method (Case Study: Percetakan Simo Jaya)

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ABSTRACT

Percetakan Simo Jaya is one of the providers of offset printing services in Surabaya. Percetakan Simo Jaya has constraints in managing its existing business processes. A business process is a set of tools used to organize activities in order to improve understanding of how these activities are interconnected to achieve a specific goal. In business process modelling, a method called Business Process Model and Notation (BPMN) is used, which is a standard for modelling business processes that provides graphical notation to describe them. The business processes at Percetakan Simo Jaya include the ordering process, raw material purchasing process, printing process, and the goods collection and delivery process. Based on the identified issues within the business processes at Percetakan Simo Jaya, this study will examine and propose improvements. The proposed improvements are expected to serve as a consideration for Percetakan Simo Jaya in refining its business processes to enhance service quality and operational effectiveness.

Keyword: Business Process, BPMN, Percetakan Simo Jaya, Business Process Management, Printing.

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1. INTRODUCTION

In its development, the printing business is no longer only dominated by large companies, but is also run by small and medium enterprises (SMEs) that contribute to regional economic growth, including in Surabaya. Therefore, continuous development and coaching efforts are needed so that printing SMEs can grow independently and become strong business actors. In the city of Surabaya itself, the potential for the printing business is quite large, but this is also accompanied by increasingly tight competition. This condition encourages business actors to offer advantages that differentiate them from competitors, such as speed of service, attractive design, and product innovation. One of the printing SMEs in Surabaya is Percetakan Simo Jaya, which focuses on offset printing services. In its business operations, Percetakan Simo Jaya faces a number of obstacles. To find out where the problems are, a model is needed. A business process model is needed to make it easier to understand the current business process.

Through discussions between researchers and the owner of Percetakan Simo Jaya, it is known that the owner wants to understand the root cause of the problems that occur. If the problems in this business process are not immediately addressed, it can have a negative impact on business continuity. Therefore, a mapping of the business process model is needed to facilitate identification and understanding of the ongoing process. In this case, the approach used is the Business Process Model and Notation (BPMN). BPMN is a method of visualizing business processes in the form of systematic flowcharts, which are able to clearly describe the sequence of activities and process flows. This modelling aims to analyse and find problem points in the business process. To support this modelling, Bizagi software is used. After the modelling process is complete, further analysis is carried out through 3 stages, namely Process Validation, Time Analysis, and Resource Analysis.

2. RESEARCH METHODS

The research uses literature study, followed by data collection to identify business processes, model existing processes, validate and verify the model, and provide business process recommendations based on the results of the model and interviews, then closed with the preparation of conclusions. The illustration of the research flow is shown in the following figure.

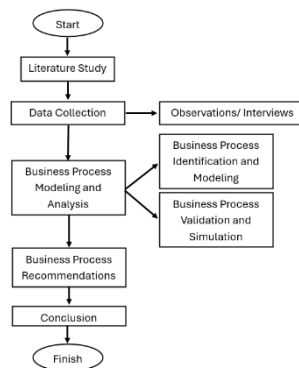


Figure SEQ Figure * ARABIC
1. Research Flow

Then in this research using literature study at this stage, studying literature relevant to the topic to be studied, including the following Business Process, Business Process Management (BPM), Business Process Model and Notation (BPMN), Bizagi Application, is an application that helps in modelling business processes with the BPMN model, Printing Production. This literature is collected from various sources, such as books, articles, websites, and related journals. After that, in collecting data, this study used primary data obtained by researchers from interviews they conducted and information sources. The method used to collect data from Percetakan Simo Jaya is non-standard or unstructured interviews, namely interviews that are more informal conversations without a standard format. After obtaining data from the results of interviews with the owners and employees of Percetakan Simo Jaya, an identification of the ongoing business processes was carried out, in this study only modelling general activities. Activities that are considered general are determined through discussions with respondents such as the ordering process, purchasing raw materials, printing, shipping and picking up goods.

In business process validation This stage aims to ensure that the process model created is in accordance with the information obtained from previous interviews. Validation is carried out by the interviewed party, by reviewing and approving the process model that has been described. After the business process design is complete, a model simulation is carried out. The verification stage is carried out to ensure that the model created is in accordance with the rules in modelling this business process by looking at the simulation results in the

Bizagi application, because there is a system process called "validate" which ensures that the model does not contain errors before being simulated and then the last business process recommendation. At this stage, the newly created model is compared with the ongoing business process, to assess its suitability and identify potential improvements in the future.

3. RESULTS AND DISCUSSION

The results of the research that have been discussed now, resulted in the implementation of BPMN and modelling business processes at Percetakan Simo Jaya and provided an analysis of the business process modelling that has been made. In the Results of Interviews/Observations with the owners and employees of Percetakan Simo Jaya and Identification of Problems will arise when the business process is identified, therefore corrective actions will be taken. The following is a table of problem identification.

Table 1. Problem Identification

No	The problem	Risk
1	Recording is still manual	Missing order note error
2	-Recording is still manual -Owners have more tasks	-Errors in purchasing raw materials -Jobs are not evenly distributed
3	Recording is still manual	Error in printing order
4	Manual recording	Lost order notes

In each business process there are problems that require different handling, therefore it requires each focus on each problem to be solved. Then in the Improvement Analysis, after identifying the problems in the ongoing business process, a number of recommendations for improvement are given. These suggestions are compiled based on the Business Process Management (BPM) approach, which aims to update the process so that it can run more effectively and efficiently. The following are suggestions for improvements to the problems that have been found.

Table 2. Repair Analysis

No	The problem	Repair Techniques	Information
1	Recording is still manual	Automation	Addition of a system that can record orders
2	-Recording is still manual -Owners have more tasks	Automation	Added system to record order details
3	Recording is still manual	Automation	Addition of a system that can record the progress of the printing process
4	Manual recording	Automation	Added system that displays order notes

There are 4 business processes that will be simulated, namely the ordering process, the raw material purchasing process, the printing process, the shipping process and the picking up of goods. After identifying issues within the current business processes, several recommendations for improvement have been developed. In line with the BPM approach, these improvements aim to enhance the effectiveness and efficiency of the business processes. The following are the recommended improvements, tailored to address the identified problems.

3.1 Ordering Process

3.1.1 Current Ordering Process

In Current Ordering Process The first business process is ordering. This business process involves 3 roles, namely customers, owners, and employees. The entire process is

still manual and is only handled by one employee from Percetakan Simo Jaya. The following is the order process sequence that can be seen from the table and image below.

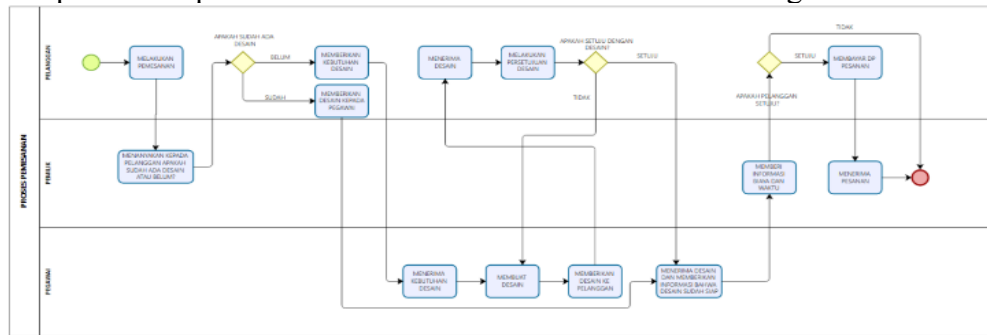


Figure SEQ Figure * ARABIC 2. Current Ordering Process

On Time Analysis each activity that occurs will be filled with the duration of how long the activity was carried out. The following is the time data for each running activity. Make a reservation 2 minutes. Ask for design 30 seconds. Customers provide design requirements information 30 minutes. Giving designs to employees 2 minutes. Accepting customer design needs 1 minute. Create a design 60 minutes. The employee gives the design to the customer 1 minute. Customer receives design 1 minute. Customer design approval 1 minute. Design information from employee to owner 2 minutes. Provide price and time information to customers 5 minutes. Customer pays down payment on order 2 minutes. Owner accepts order 30 seconds. After getting data from each activity, it is then processed in the bizagi application, here are the results, the time information for each activity is obtained from the estimated time and customer expectations. The total time required to run the current ordering process is 28 minutes.

In resource analysis, the management and allocation of resources are carried out according to the activities performed. After the resource data is obtained from each activity, it is then processed using the Bizagi application. The following are the results of the

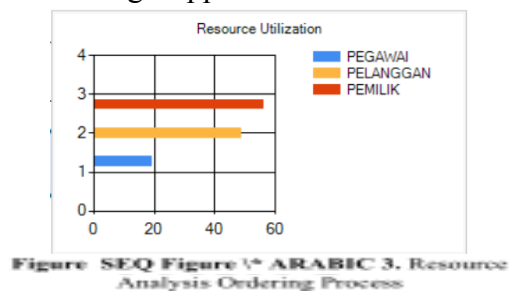


Figure SEQ Figure * ARABIC 3. Resource Analysis Ordering Process

processing:

3.1.2 To-Be Ordering Process

In To-Be Ordering Process The first business process is ordering. This business process involves 3 roles, namely customers, owners, and employees. The entire process is still manual and is only handled by one employee from Percetakan Simo Jaya. The following is the order process sequence that can be seen from the table and image below.

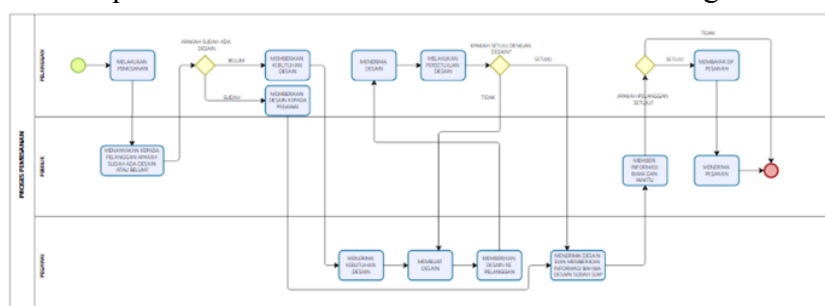


Figure SEQ Figure * ARABIC 4. To-Be Ordering Process

On Time Analysis each activity that occurs will be filled with the duration of how long the activity was carried out. The following is the time data for each running activity. Make a booking 2 minutes. Customers provide information on design needs 30 minutes. Accept customers' design needs 1 minute. Create a design 60 minutes. Employees provide designs to customers 1 minute. Customers receive design 1 minute. Customer design approval 1 minute. Design information from employee to owner 2 minutes. Provide pricing and time information to customers 3 minutes. Confirmation and payment 3 minutes. The owner accepts the order 1 minute. After getting data from each activity, it is then processed in the bizagi application, here are the results, the time information for each activity is obtained from the estimated time and customer expectations. The total time required to run the current ordering process is 22 minutes.

In resource analysis, the management and allocation of resources are carried out according to the activities performed. After the resource data is obtained from each activity, it is then processed using the Bizagi application. The following are the results of the

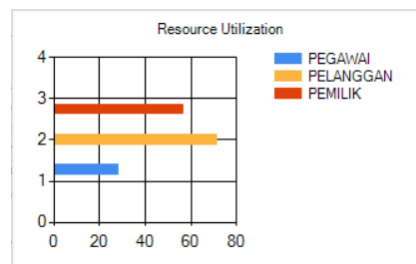


Figure SEQ Figure * ARABIC 5. Resource Analysis To-Be Ordering Process

processing:

3.2 Raw Material Purchasing Process

3.2.1 Current Raw Material Process

The next business process is the raw material purchasing process. In this process, the owner still sees the customer's order details manually and the owner sometimes comes to the supplier's place. The following is the sequence of processes in purchasing raw materials that can be seen from the table and image below.

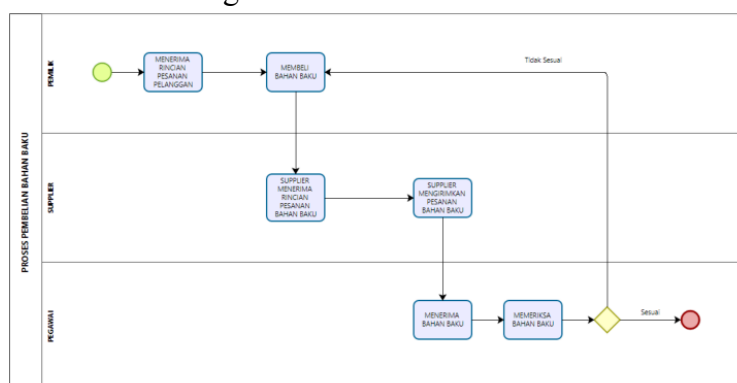


Figure SEQ Figure * ARABIC 6. Current Raw Material Process

On Time Analysis each activity that occurs will be filled with the duration of how long the activity was carried out. The following is the time data for each running activity. View Customer Order Details 10 minutes. Purchasing Raw Materials 20 minutes. Supplier Receives Raw Material Details 5 minutes. Supplier Sends Raw Material Order 90 minutes. Receiving Raw Materials 10 minutes. Checking Raw Materials 10 minutes.

After the data is obtained from each activity, it is then processed on the bizagi application, here are the results, the time information for each activity is obtained from the estimated time and customer expectations. The total time required to run the current ordering process is 4 hours 30 minutes.

In resource analysis, the management and allocation of resources are carried out according to the activities performed. After the resource data is obtained from each activity, it is then processed using the Bizagi application. The following are the results of the

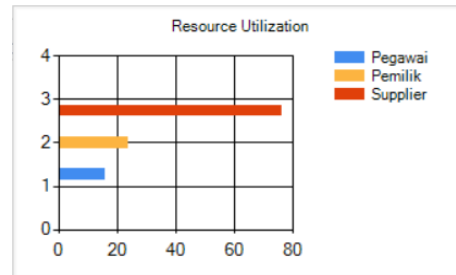


Figure SEQ Figure * ARABIC 7. Resource Analysis Raw Material Process

processing:

3.2.2 To-Be Raw Material Process

The next process is To-Be raw material purchasing process. In this process, the owner still sees the customer's order details manually and the owner sometimes comes to the supplier's place. The following is the sequence of processes in purchasing raw materials that can be seen from the table and image below.

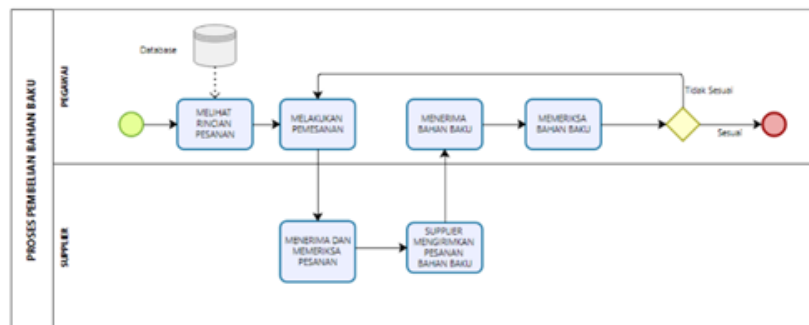


Figure SEQ Figure * ARABIC 8. To-Be Raw Material Process

On Time Analysis each activity that occurs will be filled with the duration of how long the activity was carried out. The following is the time data for each running activity. View Order Details 2 minutes. Making an Order 5 minutes. Receiving and checking orders 10 minutes. Supplier Delivers Raw Material Orders 90 minutes. Receiving Raw Materials 10 minutes. Checking Raw Materials 10 minutes.

After the data is obtained from each activity, it is then processed on the bizagi application, here are the results, the time information for each activity is obtained from the estimated time and customer expectations. The total time required to run the current ordering process is 4 hours 14 minutes.

In resource analysis, the management and allocation of resources are carried out according to the activities performed. After the resource data is obtained from each activity, it is then processed using the Bizagi application. The following are the results of the processing:

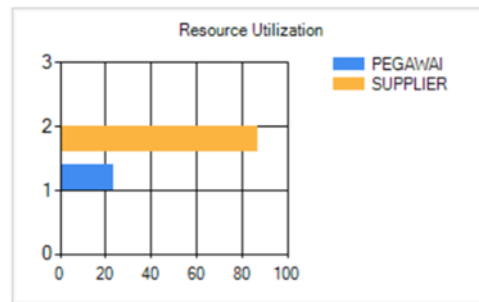


Figure SEQ Figure * ARABIC 9. To-Be Resource Analysis Raw Material Process

3.3 Printing Process

3.3.1 Current Printing Process

The next business process is the printing process. In this process the owner still sees the details of the customer's order manually the owner still does many tasks. The following is the sequence of processes in purchasing printing which can be seen from the table and image below.

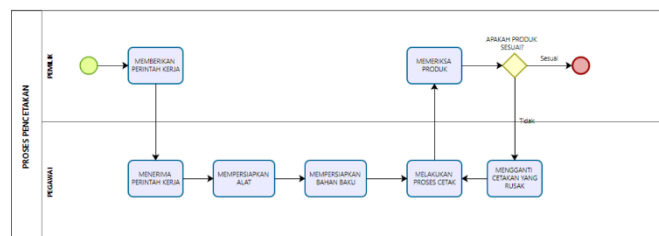


Figure SEQ Figure * ARABIC 10. Current Printing Process

In Time Analysis, each activity that occurs will be filled with the duration of how long the activity was carried out. The following is the time data for each activity that is running. Giving Work Orders 5 minutes. Receive Work Orders 5 minutes. Preparing the Tools 30 minutes. Preparing Raw Materials 30 minutes. Performing the Printing Process 2 hours 20 minutes. Checking Products 10 minutes. Replacing Damaged Molds 50 minutes.

After the data is obtained from each activity, it is then processed on the bizagi application, here are the results, from the image above, the time information for each activity is obtained from the estimated time and customer expectations. The total time required to run the current ordering process is 7 hours and 20 minutes.

In resource analysis, the management and allocation of resources are carried out according to the activities performed. After the resource data is obtained from each activity, it is then processed using the Bizagi application. The following are the results of the

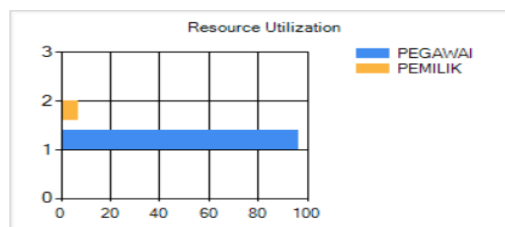


Figure SEQ Figure * ARABIC 11. Resource Analysis Printing Process

processing:

3.3.2 To-Be Printing Process

The next process is To-Be printing process. In this process the owner still sees the details of the customer's order manually the owner still does many tasks. The following is the sequence of processes in purchasing printing which can be seen from the table and image below.

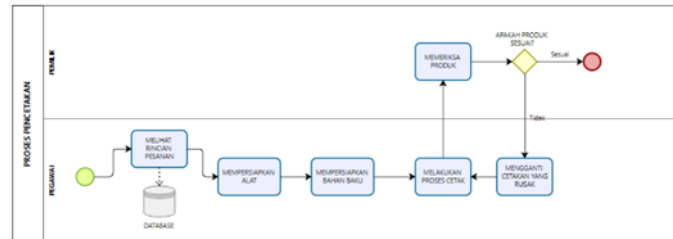


Figure SEQ Figure * ARABIC 12. To-Be Printing Process

In Time Analysis, each activity that occurs will be filled with the duration of how long the activity was carried out. The following is the time data for each activity that is running. View Database Order Details 5 minutes. Preparing the Tool 30 minutes. Preparing Raw Materials 30 minutes. Doing the Printing Process 2 hours 20 minutes. Inspecting Products 10 minutes. Replacing a Damaged Mold 50 minutes.

After the data is obtained from each activity, it is then processed on the bizagi application, here are the results, from the image above, the time information for each activity is obtained from the estimated time and customer expectations. The total time required to run the current ordering process is 7 hours and 10 minutes.

In resource analysis, the management and allocation of resources are carried out according to the activities performed. After the resource data is obtained from each activity, it is then processed using the Bizagi application. The following are the results of the

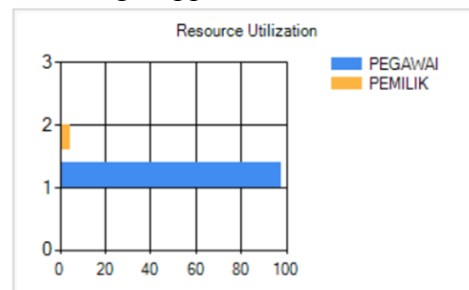


Figure SEQ Figure * ARABIC 13. To-Be Resource Analysis Printing Process

processing:

3.4 Shipping and Pickup Process

3.4.1 Current Shipping and Pickup Process

The next business process is the process of sending and picking up goods. In this process, the owner still sees the details of the customer's order manually, and the employee still makes the delivery. The following is the sequence of processes in sending and picking up goods that can be seen from the table and image below.

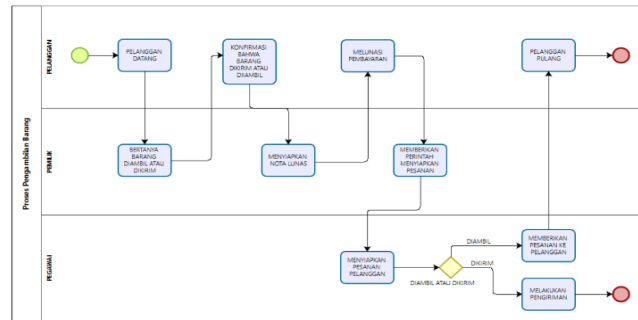


Figure SEQ Figure * ARABIC 14. Current Shipping and Pickup Process

In Time Analysis, each activity that occurs will be filled with the duration of how long the activity was carried out. The following is the time data for each activity that is running. Customers Come 3 minutes. Asking for items to be picked up or delivered 20 seconds. Confirmation that the item was picked up or delivered 20 seconds. Completing the settlement note 3 minutes. Settling Payment 3 minutes. Give orders to prepare orders 20 seconds. Preparing customer orders 10 minutes. Delivering orders to customers 3 minutes. Make a delivery 50 minutes. Customer returns 3 minutes.

After the data is obtained from each activity, it is then processed on the bizagi application. here are the results, from the image above, the time information for each activity is obtained from the estimated time and customer expectations. The total time required to run the current ordering process is 1 hour 36 minutes.

In resource analysis, the management and allocation of resources are carried out according to the activities performed. After the resource data is obtained from each activity, it is then processed using the Bizagi application. The following are the results of the

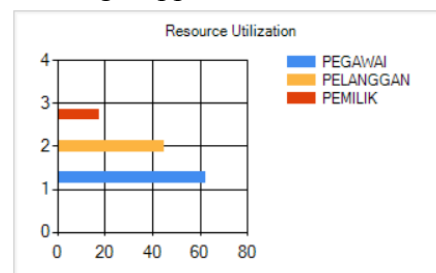


Figure SEQ Figure 1* ARABIC 15. Resource Analysis Shipping and Pickup Process

processing:

3.4.2 To-Be Shipping and Pickup Process

The next is To-Be process of sending and picking up goods. In this process, the owner still sees the details of the customer's order manually, and the employee still makes the delivery. The following is the sequence of processes in sending and picking up goods that can be seen from the table and image below.

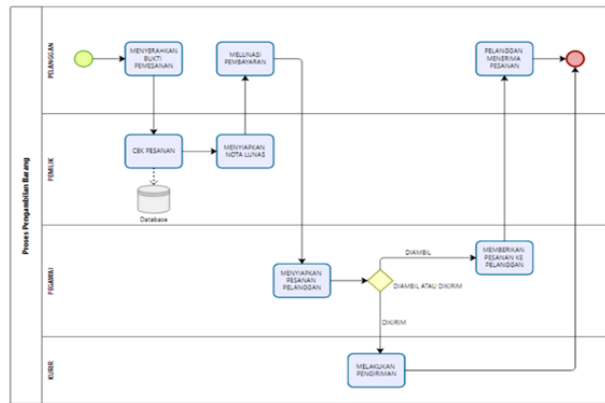


Figure SEQ Figure * ARABIC 16. To-Be Shipping and Pickup Process

In Time Analysis, each activity that occurs will be filled with the duration of how long the activity was carried out. The following is the time data for each activity that is running. Submit proof of order 2 minutes. Check the order database 2 minutes. Prepare a paid note 2 minutes. Paying Off Payments 3 minutes. Preparing customer orders 10 minutes. Delivering orders to customers 3 minutes. Make a delivery 3 minutes. Customers receive orders 25 minutes.

After the data is obtained from each activity, it is then processed on the bizagi application. here are the results, from the image above, the time information for each activity is obtained from the estimated time and customer expectations. The total time required to run the current ordering process is 1 hour 9 minutes.

In resource analysis, the management and allocation of resources are carried out according to the activities performed. After the resource data is obtained from each activity, it is then processed using the Bizagi application. The following are the results of the

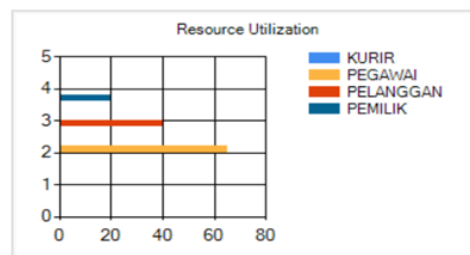


Figure SEQ Figure * ARABIC 17. To-Be Resource Analysis Shipping and Pickup Process

processing:

3.5 Business Process Comparison

After getting the simulation results of each progress, the next step is to compare the simulation results from the initial process with the proposed process. Here is the ordering business process.

Tabel 3. Comparison of Ordering Process

Time	Initial Business Process	Proposed Business Process
<i>My. Hour</i>	14 minutes	11 minutes
<i>Max. Time</i>	14 minutes	11 minutes

<i>Dec. Hour</i>	14 minutes	11 minutes
<i>Total Time</i>	28 minutes	22 minutes

It is known from the information from the table above that the initial business process from the minimum time, maximum time, average time, and total time has decreased in the proposed business process. The minimum time decreased by 3 minutes, the maximum time decreased by 3 minutes, the average time decreased by 3 minutes, and the total time decreased by 7 minutes. This decrease shows that the proposal given can help the business process become effective.

Resource	Utilization
PELANGGAN	71.43 %
PEMILIK	57.14 %
PEGAWAI	28.57 %

Resource	Utilization
PELANGGAN	48.78 %
PEMILIK	56.10 %
PEGAWAI	19.51 %

Figure 18. Comparison Resource Ordering Process

The image above shows the resources in the ordering business process, at the proposal stage there is no additional resource but there is a digitalization of the previously manual process so that it speeds up the process time. In this business process the dominant activity remains the owner and customer, because more customers already have designs, so employees rarely make designs. Then in the process of purchasing raw materials.

Table 4. Comparison of Raw Material Purchasing Process

Time	Initial Business Process	Proposed Business Process
My. Hour	2 hours 25 minutes	2 hours 7 minutes
Max. Time	2 hours 25 minutes	2 hours 7 minutes
Dec. Hour	2 hours 25 minutes	2 hours 7 minutes
Total Time	4 hours 50 minutes	4 hours 14 minutes

It is known from the information from the table above that the initial business process from the minimum time, maximum time, average time, and total time has decreased in the proposed business process. The minimum time decreased by 18 minutes, the maximum time decreased by 18 minutes, the average time decreased by 18 minutes, the total time decreased by 36 minutes. This decrease shows that the proposal given can help the business process become effective.

Resource	Utilization
PEMILIK	24.00 %
SUPPLIER	76.00 %
PEGAWAI	16.00 %

Resource	Utilization
SUPPLIER	87.34 %
PEGAWAI	23.58 %

Figure 19. Comparison Resource Raw Material Purchasing Process

The image above shows the resources in the raw material purchasing business process, at the proposal stage there is a reduction in resources, namely the owner, because the digitalization of the previously manual process has occurred, thus speeding up the raw material purchasing process time. In the business process, only employees directly see the data and then make raw material purchases from suppliers. Then in the printing business process.

Table 5. Comparison Printing Business Process Comparison

Time	Initial Business Process	Proposed Business Process
My. Hour	3 hours 40 minutes	3 hours 35 minutes
Max. Time	3 hours 40 minutes	3 hours 35 minutes
Dec. Hour	3 hours 40 minutes	3 hours 35 minutes
Total Time	7 hours 20 minutes	7 hours 10 minutes

It is known from the information from the table above that the initial business process from the minimum time, maximum time, average time, and total time has decreased in the proposed business process. The minimum time decreased by 5 minutes, the maximum time decreased by 5 minutes, the average time decreased by 5 minutes, and the total time decreased by 10 minutes. This decrease shows that the proposal given can help the business process become effective.

Resource	Utilization	Resource	Utilization
PEMILIK	7.06 %	PEGAWAI	97.62 %
PEGAWAI	96.47 %	PEMILIK	4.76 %

Figure SEQ Figure 1* ARABIC 20. Printing Process Resource Comparison

The image above shows the resources in the printing business process, at the proposal stage there is no additional resource but there is a digitalization of the previously manual process so that it speeds up the process time. In this business process the dominant activity remains the owner and employees, because there is already employee data, they can immediately carry out the printing process according to the order sequence. Then in the Shipping and Pickup Business Process.

Table 6. Comparison of Shipping and Pickup Business Processes

Time	Initial Business Process	Proposed Business Process
My. Hour	26 minutes	25 minutes
Max. Time	1 hour 9 minutes	44 minutes
Dec. Hour	48 minutes	34 minutes 30 seconds
Total Time	1 hour 36 minutes	1 hour 9 minutes

It is known from the information from the table above that the initial business process from the minimum time, maximum time, average time, and total time has decreased in the proposed business process. The minimum time decreased by 1 minute, the maximum time decreased by 36 minutes, the average time decreased by 13 minutes 30 seconds, and the total time decreased by 27 minutes. This decrease shows that the proposal given can help the business process become effective.

Resource	Utilization	Resource	Utilization
PELANGGAN	44.80 %	PELANGGAN	40.00 %
PEMILIK	17.60 %	PEMILIK	20.00 %
PEGAWAI	62.40 %	PEGAWAI	65.00 %
		KURIR	0.00 %

Figure SEQ Figure 1* ARABIC 21. Comparison of Shipping and Pickup Resources

The image above shows the resources in the process of picking and sending goods, at the proposal stage there is an additional resource, namely a courier, which was previously an employee who made the delivery, for the proposal process it is recommended that the customer pick up the goods with an additional courier.

CONCLUSION

There are various problems in the business process at Percetakan Simo Jaya, in the ordering process, because it is still done manually by the owner, so there can be errors in the sequence of the printing process, in the process of purchasing raw materials, manual recording is also still done, so the owner still sees the notes again and then gives orders to employees, in the printing process is also the same because the recording is still manual employees are still waiting for the owner to give work orders from the owner, and waiting for the sequence of the printing process. In the process of sending and picking up goods, because employees also make deliveries so that the time used by employees is more, if there are no additional couriers from customers. And the proposed business process improvements that can be given to the Percetakan Simo Jaya business process, namely automation in existing processes, because they are interrelated and can minimize errors that can be detrimental.

There are four business processes carried out, namely the ordering process, the raw material purchasing process, the ordering process, the printing process. The current business process time based on simulations using the Bizagi application is the ordering business process 28 minutes, the raw material purchasing business process 4 hours 50 minutes, the printing business process 7 hours 20 minutes, the goods pick-up and delivery business process 1 hour 36 minutes. While for the proposed business process is the ordering business process 22 minutes, the raw material purchasing business process 4 hours 14 minutes, the printing business process 7 hours 10 minutes, the goods pick-up and delivery business process 1 hour 9 minutes. Percetakan Simo Jaya can consider this so that it can complete the business process with effective and efficient time.

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