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BUSINESS PROCESS REENGINEERING THE NEW INSTALLATION PROCESS AT THE COMPANY PDAM TIRTA AGUNG TO IMPROVE THE COMPANY'S BUSINESS PERFORMANCE

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ABSTRACT

In increasingly complex business developments, companies are required to optimize business processes to be more effective and efficient. In addition, customer complaints are important feedback for companies to carry out evaluations to maintain their reputation in the eyes of customers. This study takes a case study on PDAM Tirta Agung, which provides clean water services in Babat District. Referring to interviews and observations, it was found that the legacy system used in the new installation business process has been running for more than four years and is considered inefficient, and time-consuming. Complaints from customers regarding the length of the installation process show that there is a need for repairs. Therefore, the Business Process Reengineering (BPR) method is proposed as a solution to improve service quality. BPR aims to implement radical changes to business processes so that companies can improve speed, accuracy, and cost efficiency, in accordance with the theory put forward by Hammer & Champy.

Keywords: Business process, Service optimization, Business Process Reengineering (BPR), Efficiency, Speed and precision.

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1. INTRODUCTION

Along with the rapid growth of the business world, the complexity of transactions is increasing, and the company's range of operations is getting wider, companies are required to increase their effectiveness and efficiency in optimizing each business process they run. [1].

Companies need to simplify the company's procedures in terms of consumer complaints in addition to developing increasingly complicated operations. Referring to Bell & Luddington, consumer complaints are criticisms aimed at businesses or organizations that show negative tendencies, which tendencies must be considered and evaluated by the company in order to continue to get good value in the hearts of customers and also included in the company's vision and mission to provide good service to customers [2].

In this study, I took a case study at the TIRTA AGUNG Drinking Water Regional Company, this company is a company that works in the field of water supply services for daily needs in the Babat sub-district area.

In the implementation of the business process at PDAM Tirta Agung, I obtained data through interviews and observations on May 2 with employees and customers, from the PDAM TIRTA AGUNG business process in terms of the current system legacy in the company system that has been used for more than 4 years. This legacy system is quite time-consuming for the new installation business process, The existing new installation business process when the analysis is carried out is too time-consuming so that the condition makes the business process inefficient. I also get complaints that the new installation process takes time after conducting interviews with customers, customers also complain that the new installation business process takes a long time, there are complaints from customers like this quoting from experts conveyed by bell and Luddington this will be a consideration and an evaluation of the company in order to continue to get good value in the hearts of customers. [3]

Referring to the description above, one of the solutions that needs to be implemented by PDAM Tirta Agung to improve the quality of service is to change business processes. If a business provides good customer service, then it shows that the business has met the intangible customer demands [4], with the business process reengineering method, this significant business process change will be implemented. Hammer & Champy claims that the concept of BPR 6 is a method for implementing drastic adjustments to improve business operations, resulting in real gains in performance metrics such as speed, accuracy, and cost [5].

2. METHODS

2.1 BPR (Business Process Reengineering) Method

The stages of research described in this chapter are related to the activities carried out throughout the research process. BPR (Business Process Reengineering) techniques or activities were applied in this study. This is shown in the Image, namely:

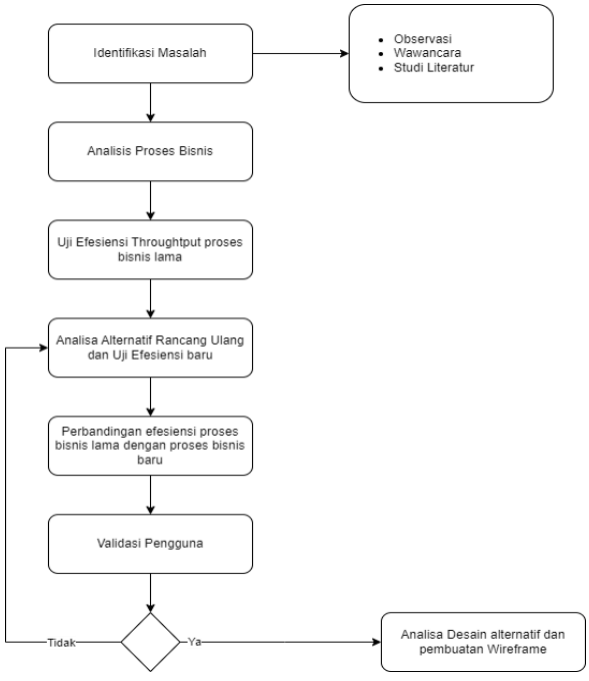


Fig. 1 BPR Method Flow.

The process flow from BPR (Business Process Reengineering) activities starting from the problem identification stage to wireframe testing as a result of the solution to answer the research objectives. In the third stage, a throughput efficiency test was carried out. The throughput efficiency test refers to the results of the calculation of business process time and performance using the ASME standard map to compare the results of the initial business process with the results of re-engineering new business processes. After the comparison is carried out, the next step is to carry out user validation related to the results of the business process recommendations that have been made whether approved or not approved by the user. If it is not approved, an alternative design will be carried out again to the business process and will be repeated until the user agrees to the proposal given, then if approved, the last stage of the process of analyzing alternative designs and making wireframes.

2.2 Problem Identification

At the stage of problem identification, it is carried out to meet the needs needed in the research. The data collection method in the research was achieved by direct observation and interviews with PDAM Tirta Agung employees, then a literature study related to Business Process Reengineering (BPR) was carried out.

1. Observation

Observation is carried out directly to PDAM TIRTA AGUNG to know and see firsthand the current process to find out the tasks and parts per field in carrying out their duties. This has the purpose of carrying out the analysis on the current process is going on later to obtain and find a new process design.

2. Interview

The interview process was carried out directly to the PDAM TIRTA AGUNG office which was periodically carried out from March 2, 2023 to March 7, 2023, the results were obtained, namely the Legacy system at PDAM TIRTA AGUNG business processes related to new installations, customer complaints and payments were carried out manually, in the new installation process and customer complaints a number of weaknesses were found in terms of speed and service that were still inefficient.

2.3 Business Process Analysis

From the results of data collection carried out at PDAM TIRTA AGUNG using a direct interview method with an administrative department employee, namely Mrs. Siti Amalia, it was found that there were weaknesses in terms of service time, from the results of data collection carried out at PDAM TIRTA AGUNG using a direct interview method with administrative department employees, namely Mrs. Siti Amalia, there were weaknesses in terms of service. The results of the business process are obtained from the business process of new installation. The actors who participated in this process were administrative officers, installation technician teams, finance and chairman. The following are the results of the business process analysis:

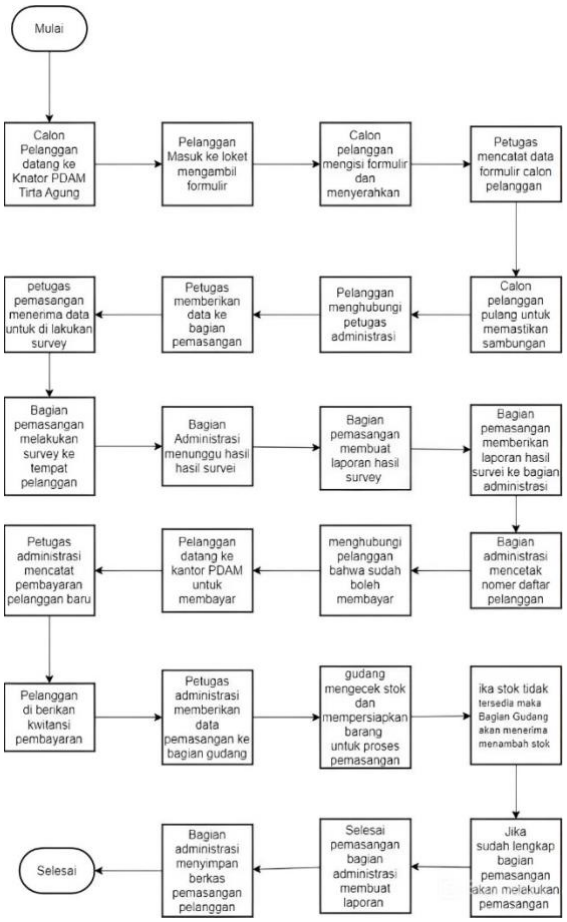


Fig. 2 Business process analysis.

2.4 Throughput Efficiency Test

Testing throughput efficiency in existing business processes at PDAM Tirta Agung. Throughput Efficiency Testing is carried out to measure the performance of services that have weaknesses in their business processes as a whole. Then mapping was carried out on the ASME (American Society of Mechanical Engineering) standard map. The purpose of this phase is to find out and measure the percentage of total service time performance. This will later be juxtaposed with business process recommendations in terms of models and results.

2.5 Results of Alternative Analysis of Redesign and Efficiency Test

At this stage, an alternative analysis will be carried out as well as a test of the efficiency of the business processes that are currently running at PDAM Tirta Agung which are made different from the ongoing business processes of this era. To create business processes that save time and cost. The use of IT (Information Technology) is used to replace activities that are still carried out manually to computerized or commonly called 31 automation, this stage also uses graphic notation in the form of BPMN to determine the process that can be carried out automation as a form of IT utilization in the improvement of new business processes later.

2.6 Comparison of the Efficiency of Old Business Processes with New Business Processes

Comparison is carried out by looking at the results of throughput efficiency from the old business process to the new business process. Which has the purpose of proving the difference in results in terms of service time in the long business process with business process recommendations at PDAM Tirta Agung.

2.7 Business Process Design Validation

At this stage, validation will be carried out related to the results of the redesign of the old business process with business process recommendations by the user, which has the purpose of ensuring whether the new business process proposal is acceptable and in accordance with the needs of the user.

2.8 Analysis of Alternative Design and Creation of BPMN

At this stage, an alternative design analysis and BPMN notation will be carried out to simulate the results of new business processes, which has the purpose of describing the appearance and flow of business process recommendations so that they are easy to understand and accurate.

3.RESULTS AND DISCUSSION

3.1 Troughtput Efficiency Test of the Installation Process AS Is

Throughput efficiency testing at the new installation business stage at PDAM Tirta Agung company. Throughput Efficiency Testing is carried out to measure the performance of time-consuming services in its business processes. Then mapping was carried out with ASME standard maps.

The model and percentage of performance in terms of total service duration were ascertained in this study using ASME standard mapping and throughput efficiency tests. Efficiency comparisons between results and models as well as recommendations for new design business processes will be implemented. Examples of ASME standard mapping and throughput efficiency calculations of new installation business processes related to service time are provided below. Using ASME standard mapping, this test is carried out to determine the overall uptime performance of the book publishing business process. The calculation findings are.

$$efisiensi\ throughput = \frac{\text{waktu proses bukan tunda}}{\text{Total waktu dalam sistem}} x100\%$$

$$= \frac{3965 - 2045}{3965} x100\%$$

$$= \frac{1920}{3965} x100\%$$

$$= 48{,}42\%$$

Fig. 3 Test the throughput efficiency of old business processes.

Referring to the results of the throughput efficiency test, the ASME standard mapping in the new installation process was achieved at an efficiency of 48.42%. This

percentage is calculated by dividing the active run time (not the delay time) by the total system time, then multiplied by 100%. The total value of the process time in the system for new installation is 3965, where 2045 is the delay time, and 1920 is the process time without delay. The total processing time is 3965 including both delay time and uptime. From these results, the throughput efficiency for the new installation process at PDAM Tirta Agung reached 48.42%, while 51.58% was still not optimal.

3.2 Business Process Modelling Notation (As is) results

At this stage, simulation and modeling of ongoing business processes are to be carried out using BPMN notation. The main goal is to make it easier to identify existing problems, as well as carry out analysis and evaluation of improvements so that the level of customer complaints related to the new installation process at PDAM Tirta Agung can be minimized. The data that support the creation of a process model in this study was obtained through interviews with respondents, understanding of technical documents in the organization, and observation results during the study. Business process simulation helps to understand, carry out evaluations, and overhaul operational procedures. The results of the process improvement can be assessed and juxtaposed using this simulation. The time difference between the implementation of the process before and after the change is implemented is calculated using the simulation results. BPMN (Business Process Model and Notation) notation is used to make this business process modeling.

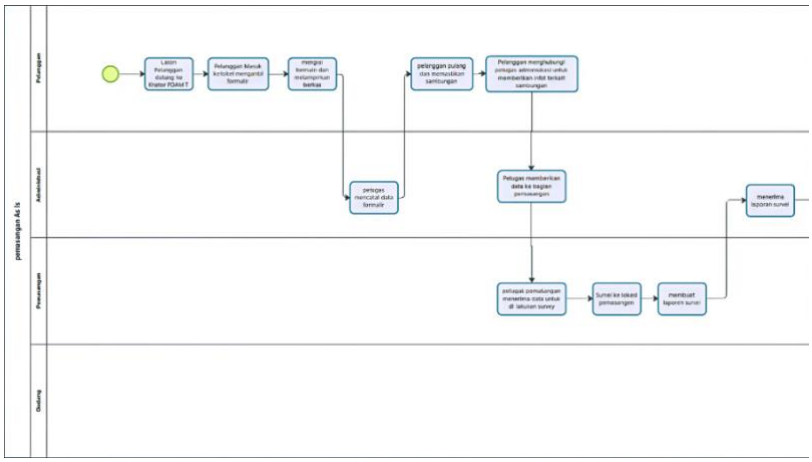


Fig. 4 BPMN Model New Installation As Is.

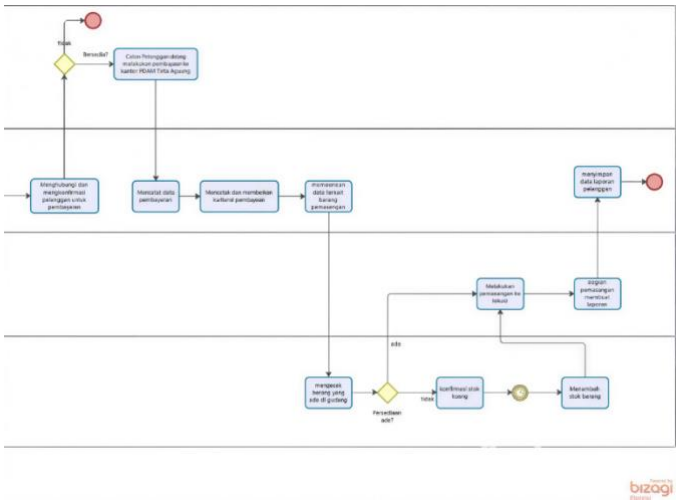
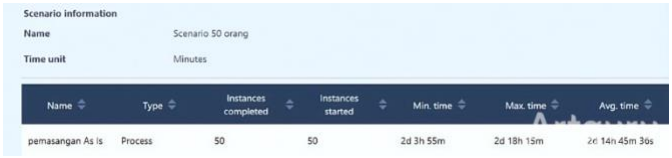


Fig. 5 BPMN Model New Installation As Is.



Scenario information

Name	Scenario 50 orang
Time unit	Minutes

Name	Type	Instances completed	Instances started	Min. time	Max. time	Avg. time
pemasangan As Is	Process	50	50	2d 3h 55m	2d 18h 15m	2d 14h 45m 36s

Fig. 6 Results of BPMN Time Process Simulation As Is.

From the picture above, the time required for each activity is achieved from the results of interviews and observations. Referring to the Figure, it can be concluded that the estimate to complete 50 new installation processes, according to the results of the current business process simulation, takes a minimum of 2 days 3 hours 55 minutes, a maximum of 2 days 18 hours 15 minutes, and an average of 2 days 14 hours 36 minutes for each person.

3.3 Redesign Alternative Analysis

At this point, a redesign potential examination is carried out, where the identified business processes have shortcomings are redesigned by utilizing techniques for process design improvement, especially process simplification and time reduction. After the refinement of the new Installation Recommendation Business Process, alternative analysis is used to build a new installation procedure. After the automation phase and elimination of the redesign, the design must be modified by analyzing the prospects for the use of information technology.

The purpose of this analysis is to identify places where technology can be refined to make the new installation procedures more effective. As outlined below, this stage results in a new, optimized installation suggestion procedure.

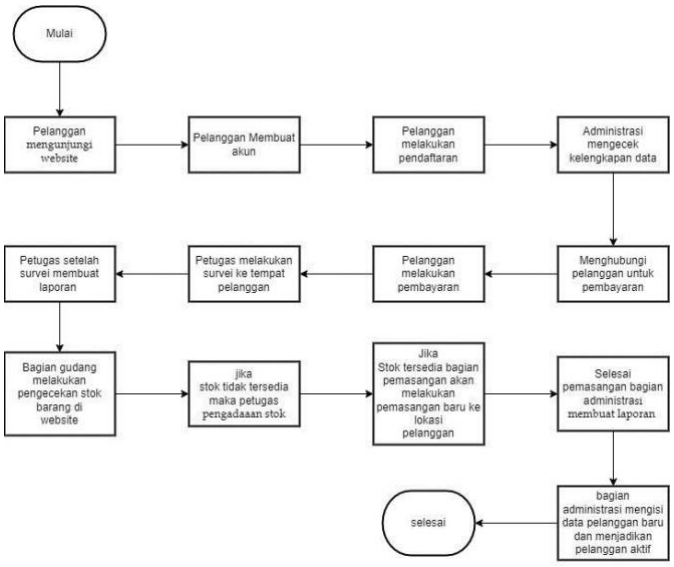


Fig. 7 Results of new business process recommendations.

For throughput efficiency tests on ASME standard business process maps, new installation recommendations.

$$
\begin{aligned}
efisiensi\ throughput &= \frac{\text{waktu proses bukan tunda}}{\text{Total waktu dalam sistem}} \times 100\% \\
&= \frac{2080 - 300}{2080} \times 100\% \\
&= \frac{1780}{2080} \times 100\% \\
&= 85{,}57\%
\end{aligned}
$$

Fig. 8 Results of the new business process throughput efficiency test.

At an efficiency percentage of 85.57%, the results of the business process efficiency test of the new installation recommendation showed a significant improvement. The same process efficiency test resulted in a lower percentage in the past because it took longer and included many useless steps. Processes that were initially complex and offer no value are eliminated and automated after alternative analysis and redesign. The whole process is accelerated by this action.

3.4 Business Process Modelling Notation (To Be) Results

At this point, the suggested business process simulation and modeling will be carried out upon completion of the design process related to the existing business process and its effectiveness as shown by the throughput efficiency test results.

Bizagi Modeler is a tool used in this job to facilitate simulations. The study used a variety of simulations, including time analysis simulations. The average amount of time it takes to execute an example of an ongoing business process is determined through time analysis. A better understanding of the variation in the amount of time required at each stage of the process is also possible by this simulation, which also makes it possible to determine the lowest and maximum amount of time that can occur in each sample process.

A number of configurations and extended time periods can be used at this stage of the simulation, which helps reduce the likelihood of process specification failures, eliminate unexpected bottlenecks, and improve system performance. A simulated Business Process Model and Notation (BPMN) for the new installation procedure of the recommended version is depicted in the figure. In addition, the next image shows the results of calculations and simulations that run using BPMN notation in the new installation process that have been optimized according to the recommendations.

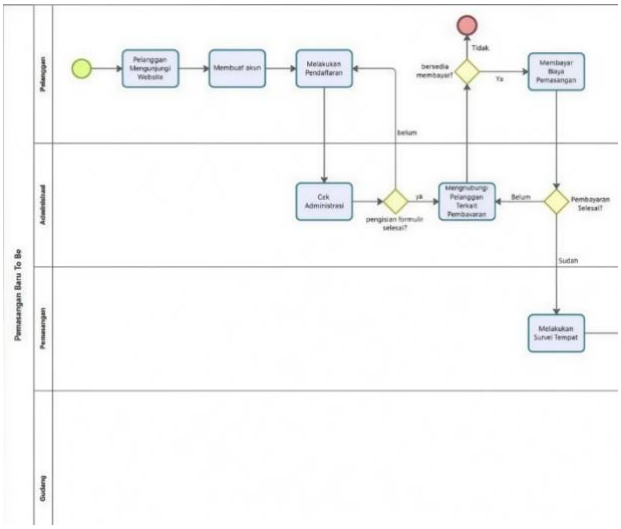


Fig. 9 Recommended version of the new installation BPMN model.

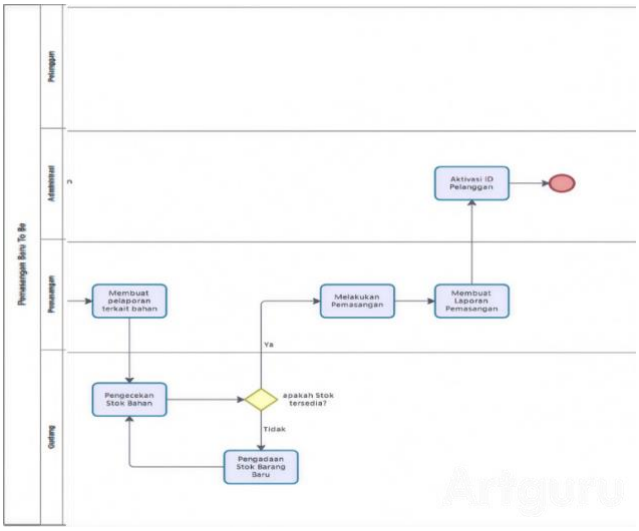


Fig. 10 Recommended version of the new installation BPMN model.

Scenario information

Name	Scenario 50 Orang
Time unit	Minutes
Duration	030,00:00:00

Name	Type	Instances completed	Instances started	Min. time	Max. time	Avg. time
Pemasangan Baru To Be	Process	50	50	1d 5h 30m	2d 1h 50m	1d 9h 16m 30s

Fig. 11 6 Results of BPMN time process simulation of new version installation Recommendations.

Using the Bizagi Modeler application, an enhanced version is simulated. The estimated time for each task is achieved from the results of observations and interviews, for example shown in the related image. Referring to the results of the simulation of the current new installation business process, here is an estimate of the time required to complete the process: This process takes an average of one day, eight hours, forty-one minutes per person, with a minimum time of one day, four hours, fifty-five minutes and a maximum time of two days, one hour, fifteen minutes.

3.5 Comparison of Old and New Business Througput Efficiency Test Results

Table 1. comparison of throughtput efficiency test as is and to be new installation process

Yes	Business Process	Test Results Efficiency	Speed Process
1	Business Process Initial installation	48,42%	3965 Minutes
2	Installation Business Process Recommendations	85,57%	2080 Minutes

At this point, the overall service time of the original business process as well as the suggested business process refers to the results of the Throughput Efficiency Test. The recommended business processes as well as the original business processes are compared in the related table. The result of the efficiency test of the old business process was 48.45%, but the recommended business process felt a very significant change in the efficiency test result, which was 85.57, thus increasing the recommended business process efficiency result of 37.15%.

3.6 Results of the comparison of the business process simulation of AS Is and ToBe

Table 2. Comparison of time process result As Is and To Be New Instalation process

Yes	Duration	Business Process AS Is	Business Process To Be
1	Minimum Duration	2 Days 3 hours 55 Minutes	1 Day 5 Hours 30 Minutes
2	Maximum Duration	2 Days 18 hours 15 Minutes	2 Days 1 Hour 50 Minutes
3	Average Duration	2 days 14 Hours 36 Minutes	1 Day 9 Hours 16 Minutes

The duration achieved from the results of the simulation of the current new installation business process and its recommendations are compared in the related table. The business procedure of the new installation now takes an average of one day, three hours, and thirty-six minutes, with a minimum of twenty-two hours and a maximum of sixteen hours and twenty-six minutes. Time reduction shows how these improvements can contribute to more productive and efficient business processes.

4. CONCLUSION

The following conclusions from the results of research carried out at PDAM Tirta Agung related to Business Process Reengineering are the conclusions of the research: Through recommendations, reengineering business processes results in modifications from old business processes to new processes, resulting in more efficient service time results. The process design

is then improved by eliminating processes that do not provide added value, known as elimination processes; turning manual tasks into computer-assisted tasks, known as automation processes; and integrate tasks to create a simpler process, known as an integration process. Information technology is used as a support for the proposed recommendation stages in order to produce more significant changes in business processes. A new installation business process was obtained at PDAM Tirta Agung.

Through the use of business process reengineering, a significant difference in speed and service was found between the old and new business processes, namely at the suggestion stage. Throughput efficiency is tested in the business procedures of the new installation. At a total process time speed of 2040 minutes, the recommendation process outperformed the old installation business process, which resulted in a yield of 48.42%. The new business process, which includes 55 at the recommendation stage, yields a yield of 85.29%. This study uses a temporal process that affects the volume of client complaints related to organizational services to model and simulate the business process of new installations in accordance with BPMN notation standards. Improvements to business processes work well and can reduce processing time, referring to the comparative findings between current business process simulations and suggested business processes. A minimum of one day of five hours and fifty-five minutes, a maximum of seventeen hours and thirty-five minutes, and an average of one day of five hours and fifteen minutes are all demonstrated by the business process of the new installation.

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