Business Process Reengineering of Praktek Kerja Nyata Registration at Department of Informatics in UMM

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Business Process Reengineering of *Praktek Kerja Nyata* Registration at Department of Informatics in UMM

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Abstract. In an organization, to achieve the goals, vision, and mission, there will be processes that support them. The Department of Informatics at the University of Muhammadiyah Malang (UMM) has processes that support the organization's goals, vision, and mission, one of which is the *Praktek Kerja Nyata* (PKN) process. PKN is included in course credits, so this activity has been planned, managed, reported, and evaluated. However, in the management of PKN documents still in separate places, students have to go back and forth to the Google Drive link. The coordinator takes time because they have to recap every time manually. With those problems, there needs to be a radical change to increase the efficiency and effectiveness of business processes. Implementing the Business Process Reengineering approach in reengineering business processes starting from the fundamentals, it was found that business processes existing that as the PKN Registration process, which has a throughput efficiency test value of 81%, after re-engineered business process resulted in business process recommendation with a throughput efficiency test value of 90.9% definitely with an increase in business process time.

Keywords: Business Process Reengineering, BPR, Throughput Efficiency, recommendation business process

INTRODUCTION

Praktek Kerja Nyata (PKN), which can be called on-the-job training, is included in course credits at the Department of Informatics at the University of Muhammadiyah Malang (UMM). Therefore, PKN has been planned, managed, reported, and evaluated. PKN process is currently supported by information technology for managing registration, implementation and mentoring, and evaluation. However, there has been renewal along with the development of the business process environment so that in the field still, there were processes that were not efficient, such as students having to contact the coordinator of PKN to delete the previous registration data for submitting a new proposal, the signatures of the head of Informatics department and coordinator of PKN not immediately become one when downloading a cover letter that the student has received, the process of requesting signatures for each document sent to different google drive link the downloading a signed document is also different google drive link, the coordinator manually recaps the document sent by a student in the google drive every time, and also the coordinator still manually recaps the student PKN scores. From the problems above, it can be concluded that the management of PKN documentation is scattered places. Students have to go back and forth to the google drive link, repeated document movement at the coordinator takes time, and the coordinator has to recap every time manually.

In an organization, information technology supports streamlining activities, reducing processes, and making decisions [1]. To improve service quality, it is necessary to understand the organization's needs first so that information technology is appropriate [2]. Approaches to process reengineering, such as Business Process Improvement (BPI), aim to simplify existing business processes to optimize the business processes [3]. BPI only changes some parts of the process to solve problems in specific areas, while BPR changes the whole process from the fundamentals of the organization [4]. Business Process Management (BPM) aims to improve the performance of an organization's service,

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but BPM only focuses on adding and reusing processes within the organization, while BPR can radically re-engineer business processes to increase time, speed, cost, and quality [5]. We need to understand the business process environment in the Business Process Reengineering approach to make radical changes that can increase the time, speed, cost, and quality of business processes in the organization.

The above statement is evidenced by the application of Business Process Reengineering (BPR) at PT Media Layar Independent. BPR was able to provide recommendations for business processes, Administration of employee registration, and employee recruitment with an efficiency value of 1.7% after reengineered increase to 72.2% so that it became a recommendation process that was applied to the wireframe [6]. Also, at PDAM Giri Tirta Gresik, BPR increased its efficiency from 73.99% to 94.44% [7]. The above business processes were mapped using the ASME (American Society of Mechanical Engineers) standard map. After that, the mapping result was continued with the throughput efficiency test [1], [7]. The result of the recommendations can be applied as an overview of the new system of business processes. In addition to the wireframe and application, Bonita Studio can also describe the business processes. One of the applications of Bonita Studio can develop Sisfo Journal Paper Review System that can manage paper reviews in one portal [8]. Bonita Studio can change business processes based on the standard Business Process Model and Notation and easily design the system's user interface by drag and drop [8], [9]. Business Process Reengineering can measure existing business processes and new business processes. The result of a new business process recommendation be designed to use Bonita Studio as a proposed business process recommendation so that the problem in the research is the implementation of BPR in the PKN at the Informatics Department at the University of Muhammadiyah Malang (UMM).

METHODS

Based on the background described, the research methodology is presented in **FIGURE 1.**

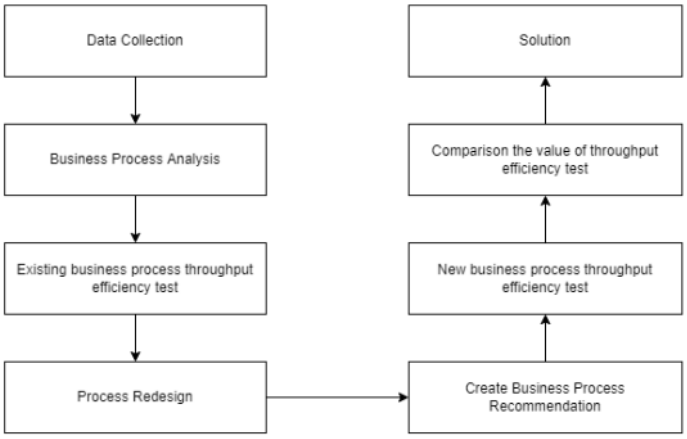

FIGURE 1. Business Process Reengineering Research Methodology

The research methodology in this study uses Business Process Reengineering (BPR) approach in conducting business process engineering. Based on **FIGURE 1**, this research flow includes data collection, business process analysis, existing business process throughput efficiency test, process redesign, creating business process recommendation, business process recommendation throughput efficiency test, comparison of the value of throughput efficiency test, and solution.

DATA COLLECTING

Data are collected at PKN Informatics Department to understand the organization's vision, mission, and goals, as well as to obtain documents, existing business processes, stakeholders, inefficient processes, and problems in the PKN process at Informatics Department at UMM. Collecting data uses qualitative methods, namely observation, interviews, and literature studies related to research.

BUSINESS PROCESS ANALYSIS

After getting data from interviews and observations, it was then identifying the processes and structures that have been existing at this time and the obstacles found in the process.

I. Existing Condition Analysis

In this stage, it will describe the existing processes in the PKN registration process at Informatics Department at UMM.

II. Analysis of obstacles in the process

Understand and recognize problems in existing business processes from data collection, observations, and interviews.

EXISTING BUSINESS PROCESS EFFICIENCY THROUGHPUT TEST

In the throughput efficiency test, as illustrated in **TABLE 1**, business processes will be mapped with the ASME (American Society of Mechanical Engineers) standard to measure the service time performance of an organization's business processes [1], [7] and understand the existing process [10]. Then the efficiency test formula to measure the overall performance time is as follows **equation 1**:

$$\text{Throughput Efficiency} = \frac{\text{Non-delayed processing time}}{\text{Total time in the system}} \times 100\% \quad (1)$$

TABLE 1. ASME Diagram

Symbol	Description	Symbol	Description
	Operation: Describe the process that occurs as a result of physical or chemical changes.		Inspection: Checking the quality and quantity of a process.
	Combined Activities: A process that is simultaneously carried out Inspection and Operation.		Transportation: Describe the process of moving from one place to another.
	Delays: Describe a process that is experiencing a waiting time.		Storage: Describe a process that has lapsed for a long time.

Process Redesign

Process design improvements were made through simplification, elimination, standardization, and process automation [1]. Thus, improving the performance of valueless and inefficient processes by replacing or eliminating them.

Create Business Process Recommendation

Redesigning the business process flow that has been carried out by improving the process redesign. Analyze the use of information technology that can be used in new business processes in the organization

New Business Process Efficiency Throughput Test

As the throughput efficiency test on the existing business process, the results of the business process recommendations are also tested for throughput efficiency using the ASME (American Society of Mechanical Engineers) standard.

Comparison of Throughput Efficiency Test Result

Comparing the results of the initial business process throughput efficiency test and business process recommendations to compare the calculated process efficiency and the time taken to complete the business process

Solution

Business process recommendations will be described using Bonita bpm studio with business process model and notation (bpmn) standards. In Bonita bpm studio, the automation process by the system at bpmn can be described by the system interface design [8].

RESULTS AND DISCUSSION

DATA COLLECTION

Collecting data uses qualitative methods, namely observation, interviews, and literature studies related to research.

BUSINESS PROCESS ANALYSIS

The result of data collection is analyzed in two parts, including an analysis of the existing business process and an analysis of problems in the PKN process.

I. Existing Condition Analysis

TABLE 2 is the flow of the PKN process in the Informatics Department at UMM.

TABLE 2. Process Stage of PKN Process

Number	Process stages
1.	Students choose the institute and members of the PKN group.
2.	Student registration SIM PKN account.
3.	The coordinator verifies the registration of the SIM PKN account.
4.	Students complete the identity form.
5.	Students register PKN.
6.	The coordinator verifies PKN registration.
7.	Students receive PKN applications and proposals.
8.	The group leader checks the application letters and PKN proposal data.
9.	The group leader submits a letter of application and a PKN proposal to ask for the signatures of the coordinator and the head of the study program
10.	Students wait for the coordinator to sign the PKN proposal.
11.	The coordinator signs the proposal.
12.	Students wait for the Head of Study Program to sign the PKN application letter.
13.	The Head of Study Program signs the PKN application letter.
14.	The Head of Study Program submits a signed application letter
15.	The PKN Coordinator submits a signed cover letter and proposal to students.
16.	Students send application letters and proposals to the institute.
17.	Students wait for the institute to give PKN reply letters to PKN students.
18.	The institute gives a confirmation letter to the PKN student.
19.	The student submits the PKN confirmation letter to the coordinator.
20.	Coordinator checks PKN confirmation letter
21.	The coordinator determines the lecture and approves the PKN of the student.

From **TABLE 2**, it can be discovered that there are four stakeholders in the PKN registration process: students, coordinators, heads of study programs, and agencies. Based on **TABLE 2**, there are 21 processes of the PKN Registration process.

II. Analysis of obstacles in the process

In the PKN registration process, there are problems are the inefficient signature request process. The coordinator must recap every time on google drive, and repeated document transfers at the coordinator take time, and the coordinator has to recap every time manually.

EXISTING BUSINESS PROCESS EFFICIENCY THROUGHPUT TEST

The business process flow existing on the PKN process is mapped using the ASME diagram, then the process time performance is measured using the Throughput Efficiency Test.

TABLE 3. Mapping the PKN Registration Process Using the ASME Diagram

Number	Process stage	○	⇨	□	D	▽	▢	Time Process (Minutes)	Stakeholder
1.	Students choose the institute and members of the PKN group.							43200	Student Collage
2.	Student registration SIM PKN account.							2	Student Collage
3.	The coordinator verifies the registration of the SIM PKN account.							1	Coordinator
4.	Students complete the identity form.							10	Student Collage
5.	Students register PKN.							5	Student Collage
6.	The coordinator verifies PKN registration.							10	Coordinator
7.	Students receive PKN applications and proposals.							1	Student Collage
8.	The group leader checks the application letters and PKN proposal data.							3	Student Collage
9.	The group leader submits a letter of application and a PKN proposal to ask for the signatures of the coordinator and the head of the study program							1	Student Collage
10.	Students wait for the coordinator to sign the PKN proposal.							4320	Student Collage
11.	The coordinator signs the proposal.							1	Coordinator
12.	Students wait for the Head of Study Program to sign the PKN application letter.							1440	Student Collage
13.	The Head of Study Program signs the PKN application letter.							1	Head of Informatics department
14.	The Head of Study Program submits a signed application letter							1	Head of Informatics department
15.	The PKN Coordinator submits a signed cover letter and proposal to students.							1	Coordinator

Number	Process stage	○	⇨	□	D	▽	▢	Time Process (Minutes)	Stakeholder
Continued									
16.	Students send application letters and proposals to the institute.							30	Student Collage
17.	Students wait for the institute to give PKN reply letters to PKN students.							4320	Institute
18.	The institute gives a confirmation letter to the PKN student.							1	Institute
19.	The student submits the PKN confirmation letter to the coordinator.							1	Student Collage
20.	Coordinator checks PKN confirmation letter							1	Coordinator
21.	The coordinator determines the lecture and approves the PKN of the student.							30	Coordinator
Total Stages		5	7	5	3	0	1	21	
Total Times		19	36	43215	10080	0	30	53380	

From the results of mapping the ASME diagram of the PKN Registration process in **TABLE 3**, then the performance of the PKN Registration process time is calculated with the throughput efficiency test formula as follows:

$$\text{Throughput Efficiency} = \frac{53380-10080}{53380} \text{ x } 100\%$$

$$= \frac{43300}{53380} \text{ x } 100\%$$

$$= 81\%$$

The results of the throughput efficiency test in the PKN Registration process are 81%.

PROCESS REDESIGN

TABLE 4 is the stage of process redesign of the PKN registration process.

TABLE 4. Process Redesign of the PKN Registration Process

Number	Process stages	Redesign Step	Note
1.	Students choose the institute and members of the PKN group.	None	
2.	Student registration SIM PKN account.	None	
3.	The coordinator verifies the registration of the SIM PKN account.	None	
4.	Students complete the identity form.	None	
5.	Students register PKN.	None	
6.	The coordinator verifies PKN registration.	None	
7.	Students receive PKN applications and proposals.	None	
8.	The group leader checks the application letters and PKN proposal data.	None	

Number	Process stages	Redesign Step	Note
Continued			
9.	The group leader submits a letter of application and a PKN proposal to ask for the signatures of the coordinator and the head of the study program	Elimination	The process is eliminated because the signature will be automated once registration is verified.
10.	Students wait for the coordinator to sign the PKN proposal.	Elimination	The process is eliminated because the signature will be automated once registration is verified.
11.	The coordinator signs the proposal.	Automation	Students, when downloading the proposal, also will get a signature.
12.	Students wait for the Head of Study Program to sign the PKN application letter.	Elimination	The signature process will be automated, eliminating the need for manual signatures and eliminating waiting times.
13.	The Head of Study Program signs the PKN application letter.	Automation	Automatically get t signature when downloading the application letter.
14.	The Head of Study Program submits a signed application letter	Elimination	The signature process will be automated, so there is no need for a time-consuming process.
15.	The PKN Coordinator submits a signed cover letter and proposal to students.	Elimination	The signature process will be automated, so there is no need for a time-consuming process.
16.	Students send application letters and proposals to the institute.	None	
17.	Students wait for the institute to give PKN reply letters to PKN students.	None	
18.	The institute gives a confirmation letter to the PKN student.	None	
19.	The student submits the PKN confirmation letter to the coordinator.	None	
20.	Coordinator checks PKN confirmation letter	None	
21.	The coordinator determines the lecture and approves the PKN of the student.	None	

In **TABLE 4**, the PKN registration process was redesigned, with six processes being eliminated and three processes being automated.

CREATE BUSINESS PROCESS RECOMMENDATION

TABLE 5 is the result of the recommendation to redesign the UMM Informatics PKN Registration process.

TABLE 5. Business Process Recommendation

Number	Process stages
1.	Students choose the institute and members of the PKN group.
2.	Student registration SIM PKN account.
3.	The coordinator verifies the registration of the SIM PKN account.
4.	Students complete the identity form.
5.	Students register PKN.
6.	The coordinator verifies PKN registration.
7.	Students receive a signed application letter and PKN proposal. *(automation from redesign)*
8.	The group leader checks the application letters and PKN proposal data.

Number	Process stages
Continued	
9.	Students send application letters and proposals to the institute.
10.	Students wait for the institute to give PKN reply letters to PKN students.
11.	The institute gives a confirmation letter to the PKN student.
12.	The student submits the PKN confirmation letter to the coordinator.
13.	The coordinator checks the PKN confirmation letter.
14.	The coordinator determines the lecture and approves the PKN of the student.

From **TABLE 5,** there are three stakeholders in the PKN registration recommendation process: students, coordinators, and institutes. There are 14 stages in the recommendation process for PKN Registration. The most changes are in the signature process of the coordinator and the head of the study program, so the students no need to wait for a signature and reduce the coordinator process. The process of requesting a signature has been removed, and students do not need to wait for the coordinator and head of the study department to sign the document.

BUSINESS PROCESS RECOMMENDATION THROUGHPUT EFFICIENCY TEST

It calculated the efficiency test of business process recommendations determined in the previous stage. This calculation is to find out the results of improving the efficiency of the process that has been refined. In **TABLE 6** are recommendations for new business processes on the PKN Registration Process, which were mapped using the ASME diagram.

TABLE 6. Mapping the PKN Registration Process Recommendation Using the ASME Diagram

Number	Process stage	○	⇨	□	D	▽	▢	Time Process (Minutes)	Stakeholder
1.	Students choose the institute and members of the PKN group.							43200	Student Collage
2.	Student registration SIM PKN account.							2	Student Collage
3.	The coordinator verifies the registration of the SIM PKN account.							1	Coordinator
4.	Students complete the identity form.							10	Student Collage
5.	Students register PKN.							5	Student Collage
6.	The coordinator verifies PKN registration.							10	Coordinator
7.	Students receive a signed application letter and PKN proposal.							1	Student Collage
8.	The group leader checks the application letters and PKN proposal data.							3	Student Collage
9.	Students send application letters and proposals to the institute.							30	Student Collage
10.	Students wait for the institute to give PKN reply letters to PKN students.							4320	Student Collage

Number	Process stage	○	⇨	□	D	▽	▢	Time Process (Minutes)	Stakeholder
Continued									
11.	The institute gives a confirmation letter to the PKN student.							1	Institute
12.	The student submits the PKN confirmation letter to the coordinator.							1	Student Collage
13.	Coordinator checks PKN confirmation letter							1	Coordinator
14.	The coordinator determines the lecture and approves the PKN of the student.							30	Coordinator
Total Stages		3	4	5	1	0	1	14	
Total Times		17	33	43215	4320	0	30	47615	

From the results of mapping the ASME diagram of the Recommendation for the PKN Registration process in table 3, then calculating the performance of the PKN Registration process with the throughput efficiency test formula as follows:

$$Efficiency\ throughput = \frac{47615\text{-}4320}{47615} \text{ x } 100\%$$
$$= \frac{43295}{47615} \text{ x } 100\%$$
$$= 90{,}9\%$$

The results of the throughput efficiency test in the Recommendation for the PKN Registration process are 90.9%.

COMPARISON OF THROUGHPUT EFFICIENCY TEST RESULT

At this stage, the results of the overall throughput efficiency test of the existing process and the recommendation process are compared. In addition, it can be seen the comparison of the total speed of each process.

The comparison results in **TABLE 7** show that the PKN Registration process has increased in the throughput efficiency percentage value from 81% with a total time of 53380 minutes to 90.9% with a total time of 47615 minutes so that the redesign process of the PKN Registration has increased in the efficiency percentage value throughput of 9.9% and cut time by 5765 minutes.

TABLE 7. Comparison Throughput Efficiency Existing Process and Recommendation Process

Business process	Existing Business Process Throughput Efficiency	Recommendation Business Process Throughput Efficiency	Existing Time Speed	Recommendation Time Speed
PKN Registration	81%	90,9%	53380 minute	47615 minute

SOLUTION

Based on the business process redesign recommendation, the solution in this research is using Bonita BPM Studio. Bonita BPM Studio can simulate manual and automation tasks based on the efficiency test result. **FIGURE 2** is a design recommendation for a PKN application letter. The signature has been automated so that students do not need to request a signature from the coordinator and the head of the study program because they have attached the application letter after the PKN registration is approved.

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To : HRD PT Telkom Indonesia

Assalamualaikum Wr. Wb
In order to improve the theoretical and practical abilities for students of **the Informatics Study Program, Faculty of Engineering, University of Muhammadiyah Malang**, we respectfully request that you give permission/recommendation to our students to do on job training at Telkom Indonesia. are as follows:

No	NIM	Student Name	Phone	Email
1.	20181037031201	Bariyatus Diyah Nurlaili	081997723543	tutusnaili@webmail.umm.ac.id

The on-job training is planned to be carried out from June 30, 2022, to September 30, 2022.
Given the limited time provided for students in finding job training locations, we hope for a response from you within a maximum of 21 (twenty-one) days after this letter was issued. Responses can be submitted in writing either directly to the student concerned, or also sent to us by post or email to the address pkn-nformatika@umm.ac.id. If within that time period there is no response from you, then we consider that you are not willing to accept our students in carrying out these activities.
Thus, for your attention and assistance, we thank you.
Wassalamu'alaikum Wr. Wb.

Head of Engineering Faculty
Head of informatics Departement

(Galih Wasis Wicaksono, S.Kom, M.Cs)

FIGURE 2. Recommendation Design Application Latter of PKN

CONCLUSION

This study concludes that Business Process Reengineering (BPR) can help change inefficient business processes to be more effective and efficient by considering every aspect of the organization. The PKN registration at the Informatics Department at UMM, which was previously 81% with a time speed of 53380 minutes, can be increased to 90.9% with a faster time speed of 47615 minutes. Students no longer need to wait for the coordinator's signature and the study program's head. Coordinators and Head of Study Programs do not need to download and re-upload files, so the system storage is not full quickly. The drawback of this research is that there is no time validation based on the results of observations but only time estimates from the coordinator because the information system SIM PKN on progress redeveloping. This study recommends that future information system development use SDLC or software design methods and time validation using the observation method.

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