Model of Business Process Improvement in Organizations Based on the Business Process Improvement Approach

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Abstract

Business processes are key in managing activities and relationships between activities in an organization. However, managing business processes in organizations still has problems such as inefficiency and ineffectiveness. Therefore, good business process management is needed. Good business process management can be done by conducting business process analysis and modeling (BPAM). On this basis, a model of a business process improvement was created based on the Business Process Improvement approach. This model aims to improve business processes within a business activity and the relationships between business activities. This model produces stages that include 1) Determining the scope based on the value chain; 2) BPAM based on business process modeling notation; and 3) Business process improvement based on 12 tools fundamental and techniques of Integration, improvement, and replacement. Based on the results of applying this model, it can be used as a guide for organizations in making improvements to their business processes.

***Keywords*:** business process, business process analysis and modeling, business process improvement

1. Introduction

Organizations today must be able to carry out their operational activities in an efficient and effective manner in order to compete in this modern era (Permatasari, Aknuranda and Setiawan, 2018). This collection of operational activities is called a business process (Widyasari, Setiawan and Perdanakusuma, 2019)(Atrinawati and Pratikta, 2019). Business processes are expected to increase competitiveness and effective collaboration in realizing organizational goals (Yunita, Aditya and Ekaputra, 2021)(Yaqin et al., 2019). Therefore, business processes are the key point in managing activities, along with the relationship between one activity and other activities in an organization (Yunita, Aditya and Ekaputra, 2021)(Hamzah and Hariyanto, 2021). However, problems in business processes in organizations still occur, such as being inefficient, ineffective, not optimal, not integrated, this is due to poor business process management (Hende, Setiawan and Mursityo, 2018)(Susanto, Pramono and Setiawan, 2018)(Hutagalung, Setiawan and Rokhmawati, 2019)(Afif and Prasetyo, 2021).

Poor business process management has an impact on decreasing productivity, service quality, and organizational performance, thus greatly affecting the achievement of organizational goals (Hende, Setiawan and Mursityo, 2018)(Bakhrun and Hutahaean, 2021)(Pramudita and Safitri, 2019). Therefore, good business process management is needed Good business process management makes it easy to understand and communicate between stakeholders by analyzing and modeling business processes (Widyasari, Setiawan and Perdanakusuma, 2019). Business process analysis is the activity of identifying and evaluating an ongoing business process so that it can be seen which areas need improvement (Nurhayati and Setiadi, 2017). Meanwhile, business process modeling is a way of visualizing the relationships between stakeholders in a business process based on applicable organizational rules and policies (Widyasari, Setiawan and Perdanakusuma, 2019). Business process analysis and modeling is the main key to business process improvement. Meanwhile, the business process improvement approach that is often used is business process improvement (BPI) (Maulana,

2023b). Therefore, this research aims to create a business process improvement model based on the BPI approach. Before conducting research, first carry out a literature study of previous papers, both journals and proceedings, in the period 2018 to 2023.

From the results of the literature study conducted, the improvement techniques used in previous research resulted in two categories of business process improvement techniques which include: 1) 12 tools fundamental BPI (Hende, Setiawan and Mursityo, 2018)(Bakhrun and Hutahaean, 2021)(Sunoto, 2020)(Pramudita and Safitri, 2019)(Sutandi, 2020)(Helmi, Aknuranda and Saputra, 2018); 2) Integration, improvement and replace (IIR) (Rahmawati, Rokhmawati and Perdanakusuma, 2017). However, there has been no research in business process improvement that elaborates on these two improvement techniques (Maulana, 2023b). By elaborating on these two techniques, improvements are even better, because improvements can be made to an activity and the relationship between activities in one or more business processes (Yunita, Aditya and Ekaputra, 2021)(Hamzah and Hariyanto, 2021). Integration is a very important business process improvement because it is an improvement in the relationship between activities in one or more business processes. Likewise with improvement techniques, namely improving activities and relationships between activities with the support of information technology, business processes are more efficient and effective. Replace is a technique for improving business processes by rearranging activities and relationships between business activities (Maulana, 2023b).

Therefore, this research aims to create a model of a business process improvement by elaborating on these two improvement techniques. The business process improvement model is based on Harrington's BPI (Larasati, Wicaksono and Wardani, 2017) which is contained in the three stages of BPI, namely: 1) Organizing for Improvement is the activity of determining the scope; 2) Understanding the Process is a business process analysis and modeling activity; 3) Streamlining is a business process improvement activity. The purpose of this model was created so that it can be used as a guide in improving an organization's business processes. Therefore, in implementing or implementing this process improvement model, use case studies in the Academic Administration section of Dinamika University.

2. Methods

Research methodology is a stage in research whose preparation is carried out systematically and scientifically, which is used to solve research problems. This research includes three stages, namely beginning, development and end, as in Figure 1.

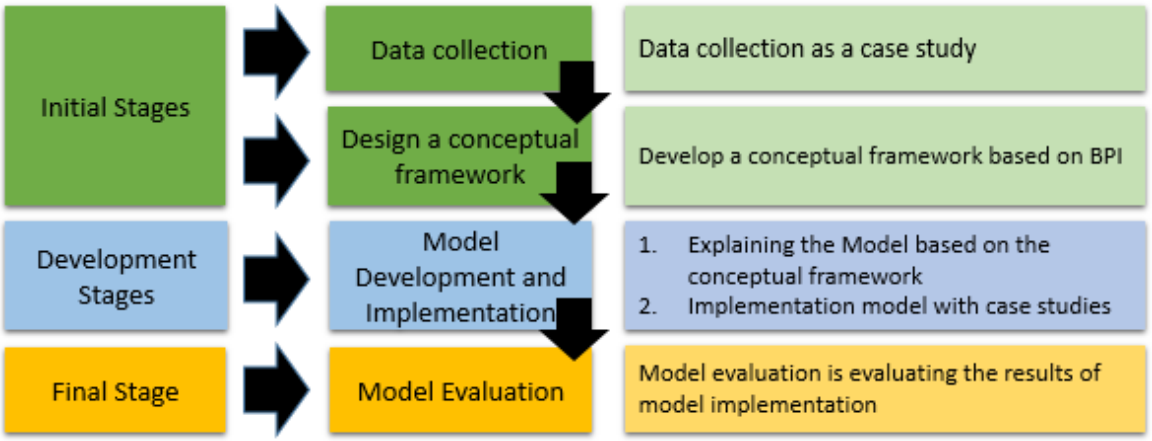

Figure 1. Research methodology

2.1. Initial Stage

a. Data Collection

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Data collection is an activity to collect data used as a case study in this research. This case study was carried out at the Academic Administration (AAK) of Dinamika University. The data collected includes 1) Objectives; 2) Organizational Structure; and 3) Business Process.

b. **Designing a Conceptual Framework**

At this stage, a conceptual framework for a business process improvement model based on BPI is developed. This conceptual framework is based on BPI by Harrington, as in Figure 2 (Larasati, Wicaksono and Wardani, 2017). Organizing for Improvement is the activity of determining the scope of business processes that will be improved. Understanding the Process is the activity of understanding all business processes based on a predetermined scope. Meanwhile, Streamlining is a business process improvement activity.

Business process improvement at BPI is known as 12 fundamental tools, which include Duplication Elimination, Bureaucracy Elimination, Simplification, Process cycle-time Reduction, Value-added Assessment, Upgrading, Simple Language, Standardization, Supplier Partnerships, Big Picture Improvement, Error Proofing, Automation and/or mechanization (Sutandi, 2020)(Helmi, Aknuranda and Saputra, 2018)(Larasati, Wicaksono and Wardani, 2017).

However, process improvements based on other literature include IIR (Rahmawati, Rokhmawati and Perdanakusuma, 2017). This business process improvement is based on a gap analysis between current and expected conditions. Furthermore, the proposed improvements are used as recommendations for the organization.

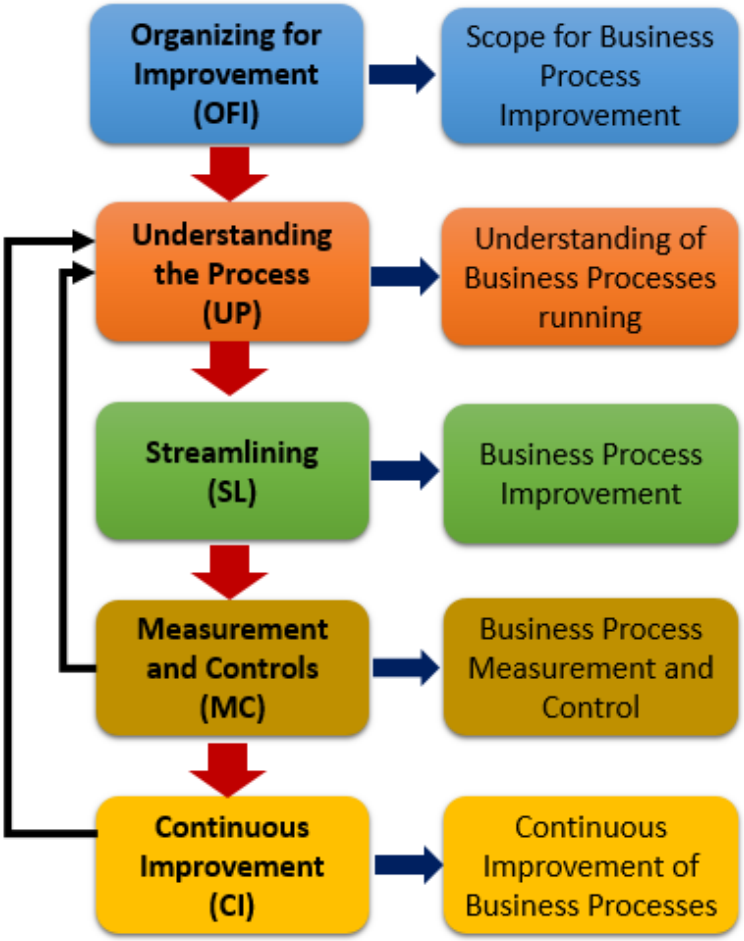

Figure 2. Model of BPI (Larasati, Wicaksono and Wardani, 2017)

2.2. Development Stage

This stage is the development of a business process improvement model based on a conceptual framework with case studies in the Academic Administration section of Dinamika University.

a. Organizing for Improvement

This stage is an activity to determine the scope of business processes in the organization that will be improved using the value chain theory (Maulana, 2023b). Value chain theory is most often used in determining the scope for business process improvements (Maulana, 2023b). The scope is determined based on the core activities of the organization's business processes, as in Figure 3.

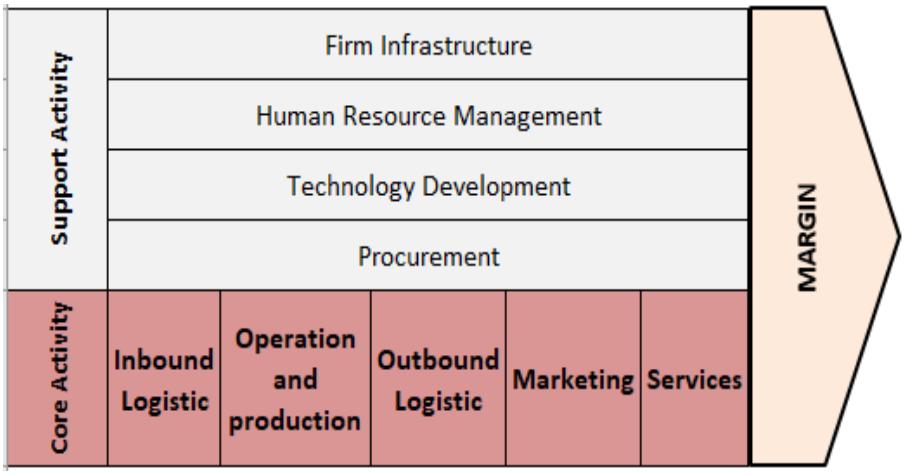

Figure 3. Value Chain (Suseno, Arifin and Sutrisno, 2020)

b. Understanding the Process

This stage is modeling the business processes resulting from activities that have been determined by value chain theory. Next, this business process is modeled based on business process modeling notation (BPMN). BPMN functions to understand business processes that run efficiently and effectively. After modeling the business process, an analysis of the modeling is carried out. The analysis used is risk analysis. Risk analysis is the activity of analyzing each activity and the relationship between activities in a business process based on the impact of the risk, as shown in Table 1 (Maulana, 2023a).

This modeling and analysis is based on interviews and observations. Interviews were conducted with the head of the AAK section and staff as business process owners, as well as the Head of the Information Technology Development and Application Section (PPTI) as an IT service management expert who holds the title CITSM (Certified IT Service Manager) in the ITIL field to validate this business process improvement model.

Table 1. Risk Analysis

Business Activities	Problem	Risk
Activities 1	Problem 1	Risk 1
Activities 2	Problem 2	Risk 2
Activities n	Problem n	Risk n

c. **Streamlining**

This stage is an activity to elaborate two improvement techniques, namely the 12 fundamental tools of BPI and IIR. This stage is a process of improving business activities and processes based on 12 fundamental BPI and IIR tools. BPI's 12 fundamental tools technique is used to improve business processes in one business activity, while IIR is used to improve between business processes in more than one business activity, as illustrated in Figure 4.

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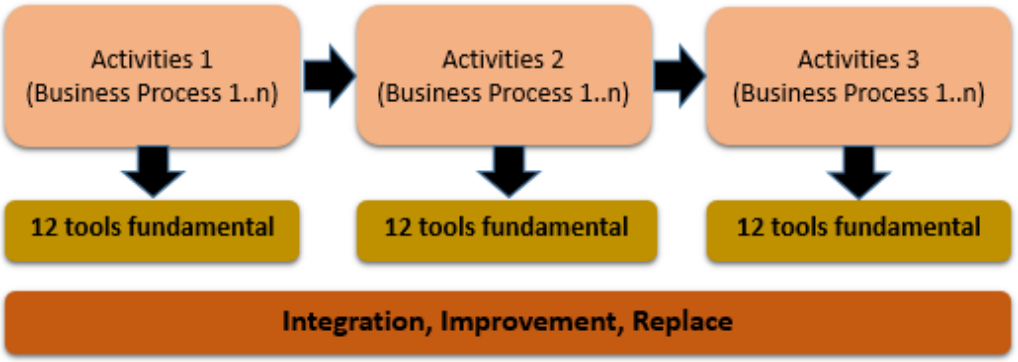

Figure 4. Conceptual Framework for Business Process Improvement

Table 2. Business Process Improvement based on 12 BPI Tools

Business Process	12 tools fundamental
Business Process 1	The selection of improved types 1 to 12 is adjusted to the problem
Business Process 2	The selection of improved types 1 to 12 is adjusted to the problem
Business Process n	The selection of improved types 1 to 12 is adjusted to the problem

Table 3. Improvements between Business Process Activities based on IIR

Business Activities	Activities 1	Activities 2	Activities n
Activities 1	X	IIR	No Relationship
Activities 2	IIR	X	IIR
Activities n	No Relationship	IIR	X

2.3. Final Stage

This stage carries out verification and validation based on BPI and interview methods. The purpose of verification is to evaluate business process improvement models based on BPI stages or approaches. The purpose of the validation is to evaluate the business process improvement model based on the interview method with the Head of the Information Technology Development and Application Section (PPTI) as an expert judgment who already has a Certified IT Service Manager (CITSM) certification in the field of Information Technology Infrastructure Library (ITIL). Apart from that, we also interviewed AAK staff as owners of the business processes used as case studies. At this final stage, conclusions are drawn and suggestions for further research are made based on the results of this research.

3. Results and Discussions

These results and discussions review the results of each stage of the research methodology which includes the initial stage, development stage, and final stage.

3.1. Initial Stage Result

a. Data Collection

This stage produces data from the Academic Administration section of Dinamika University which is the object of this research. The data are as follows: 1) The aim is to develop innovative education; 2) Organizational structure, as in Figure 5; 3) Main functional roles and tasks, as in Table 4.

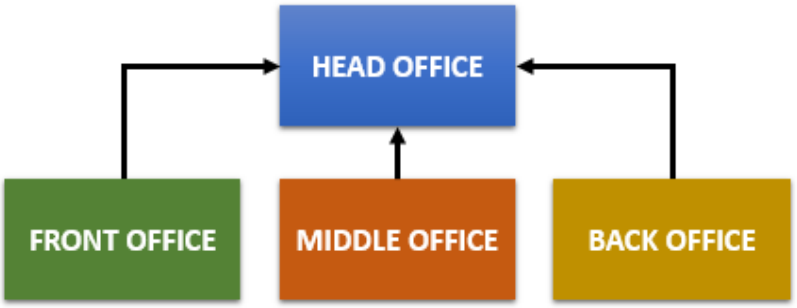

Figure 5. AAK Section Organizational Structure

Table 4. AAK Main Functional Roles and Duties

Role	Main and functional tasks
Head Office	Create policies, rules and guarantee the entire lecture process.
Front Office	1. Manage trust administration. 2. Manage lecture administration. 3. Manage student announcements.
Middle Office	1. Manage judicial administration. 2. Manage Scholarship services. 3. Manage academic letter requests. 4. Managing Diploma Legalization Requests
Back Office	Manage exam administration and assessments.

b. Designing a Conceptual Framework

This stage produces a conceptual framework in accordance with the scope of business process improvement, as in Figure 6.

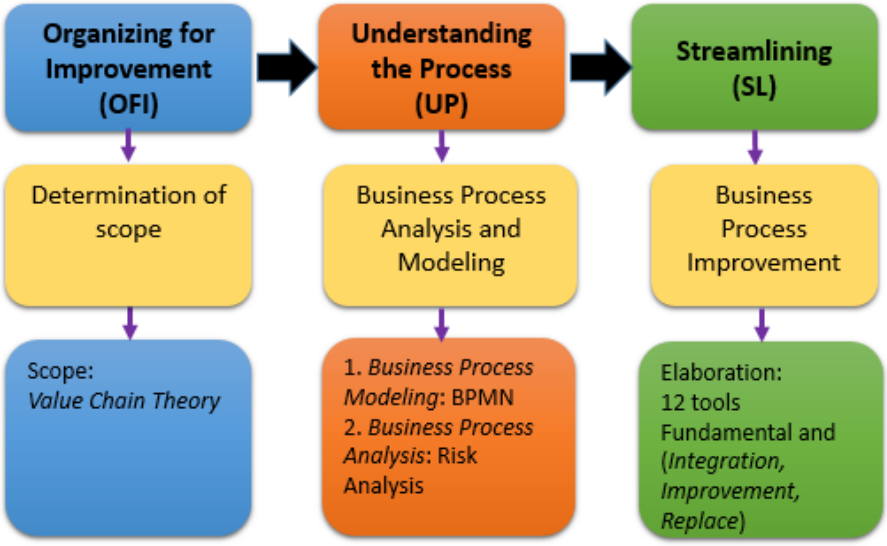

Figure 6. Conceptual Framework of Business Process Improvement Model based on BPI

3.2. Development Stage Result

This stage produces a conceptual framework in accordance with the scope of business process improvement, as in Figure 6.

a. Organizing for Improvement

This stage is an activity to determine the scope of business processes in the AAK section based on value chain theory, as in Figure 7. This scope is a business process that will be improved, especially core activities in the AAK section.

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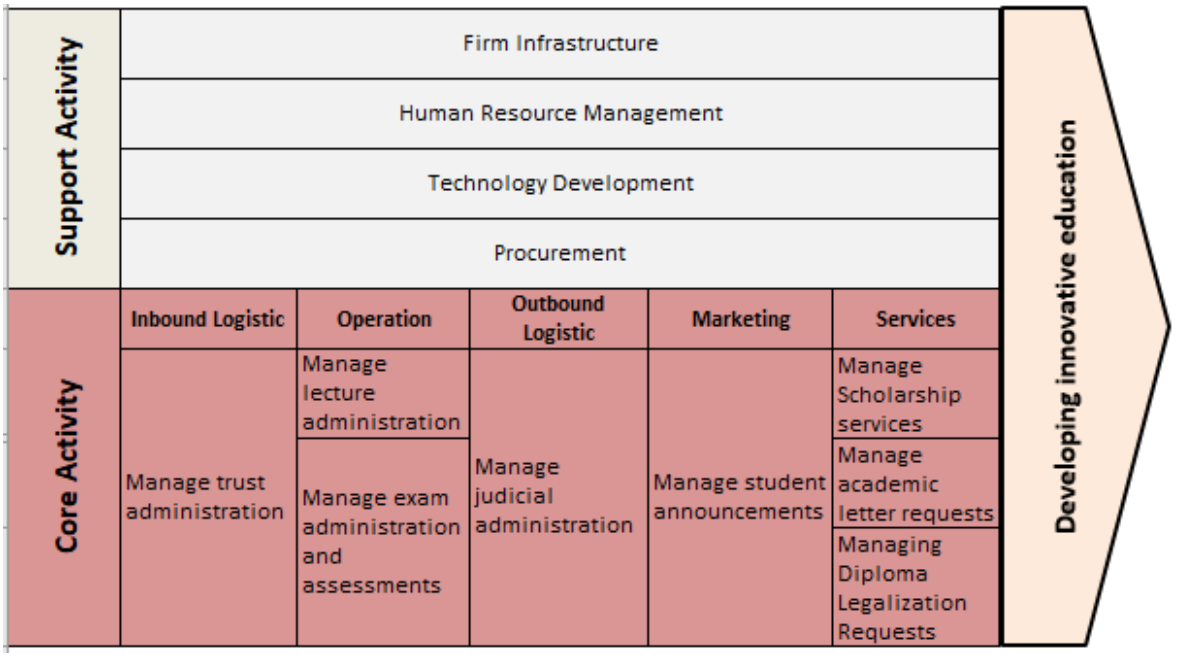

Figure 7. Value Chain AAK

b. Understanding the Process

Based on the value chain results in the AAK section, it produces eight core activities, but what is used as a case study in this business process improvement model are three activities which include: 1) Manage lecture administration; 2) Manage administration exams and assessments; 3) Manage judicial administration. These three activities were chosen because they represent improvements based on the 12 fundamental tools and IIR. Next, the three business activities are modeled using BPMN.

Figure 8 explains the modeling of manage lecture administration. This business activity begins with the lecturer delivering learning material and also providing reinforcement in the form of assignments to students. Before the learning process and assignments, lecturers first make preparations by preparing learning media that has been provided by general administration staff. Next, the general administration staff records lecturer attendance. Meanwhile, students authenticate using a card on a card reader prepared in class. Apart from that, the lecturer also validates student attendance on the web-based application provided by the general administration section. Then this attendance is recapitulated by the front office.

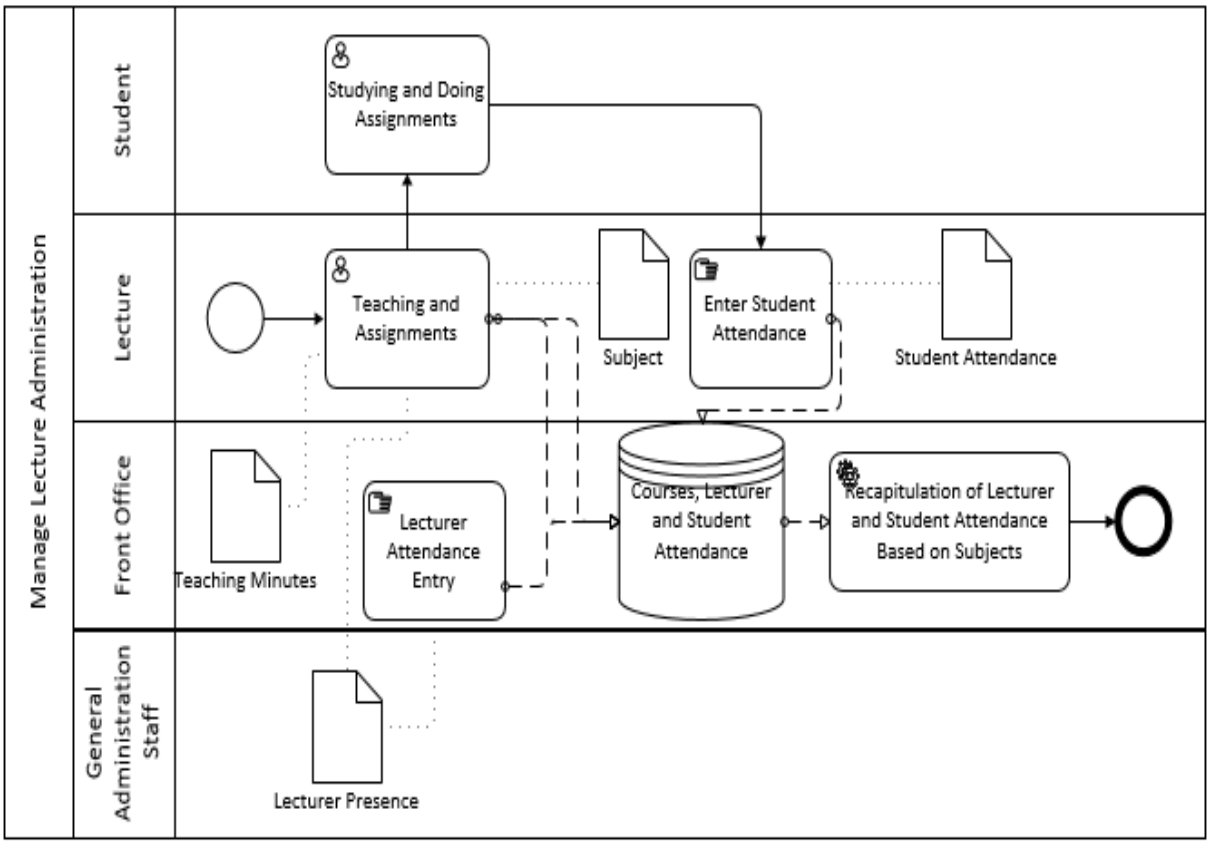

Figure 8. Modeling of Manage Lecture Administration

Figure 9 explains the modeling of manage administration exams and assessments, which is an assessment activity by lecturers for the results of students who have taken exams.

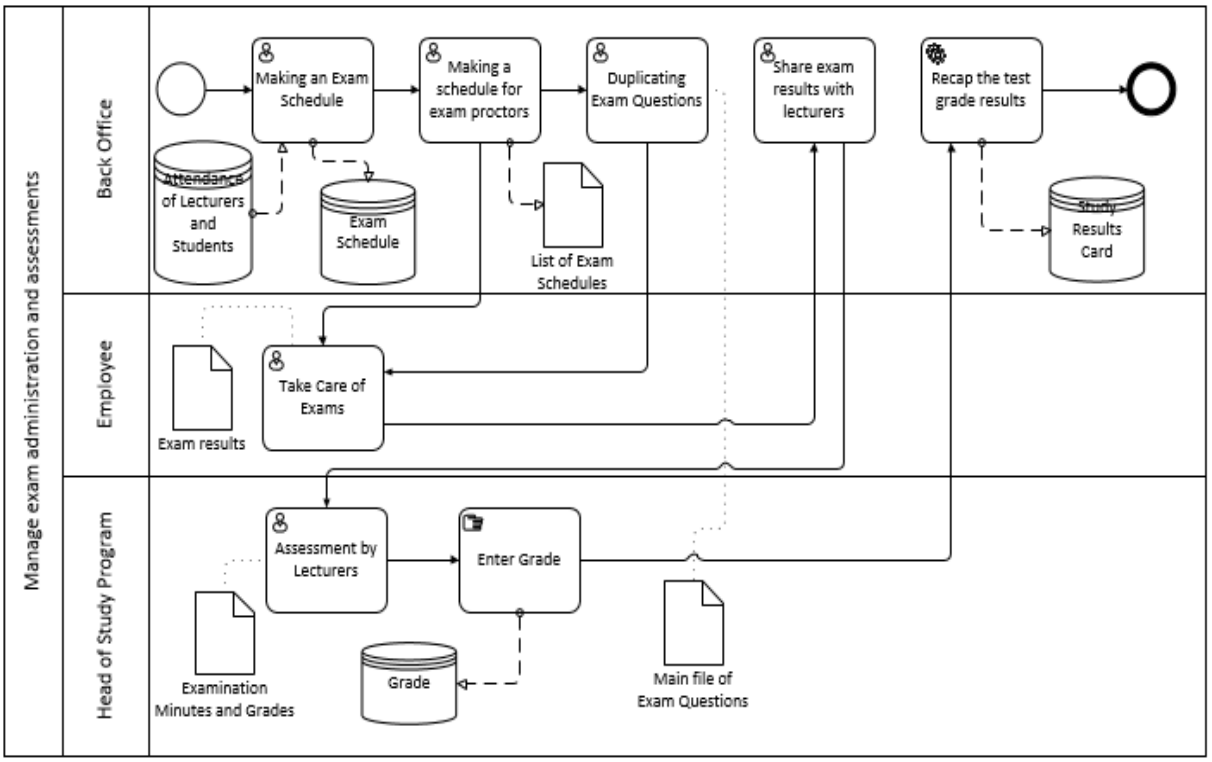

Figure 9. Modeling of manage administration exams and assessments

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Figure 10 explains the modeling of manage judicial administration. This business activity begins by checking study limits, which is a check of the results of calculating the recapitulation of each student's grades. Next, the judicial requirements are checked, if they are appropriate, approval is carried out and then a recapitulation of students who pass the judiciary is carried out and announced to the academic community.

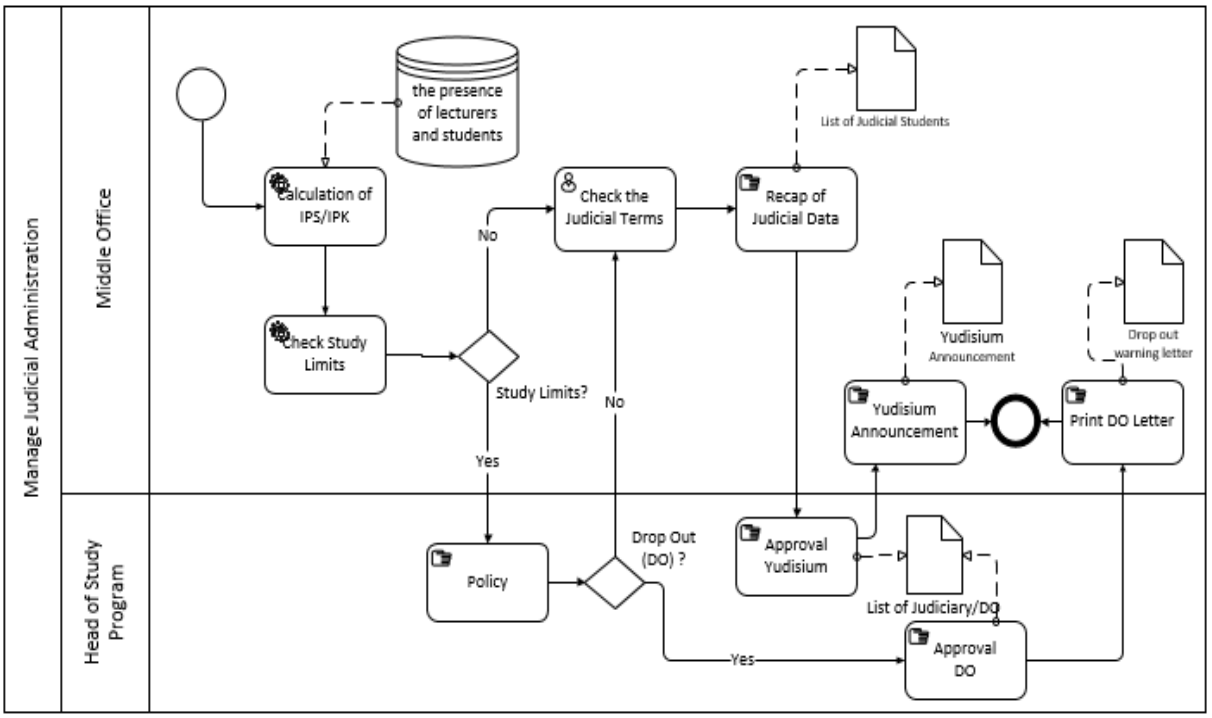

Figure 10. Modeling of manage judicial administration

Based on the modeling of business activities, the next step is to analyze based on the environment and risks that occur in these activities, The results are shown in Table 5.

Table 5. Problems and Risks in Business Activities

Business Activities	Problem	Risk
Manage lecture administration	Efficiency and effectiveness of managing the presence of lecturers and students	Reduce attendance time
Manage administration exams and assessments	Efficiency and effectiveness in making exam schedules and assignments as exam supervisors	Reduces the time and accuracy of exam scheduling and time for assignment to exam supervisors.
Manage judicial administration	Effectiveness of judicial administration	Reducing inaccuracies in determining judicial requirements.

c. Streamlining

This stage is an improvement activity by elaborating two techniques, namely the 12 fundamental tools of BPI and IIR, as shown in Figure 11. The first stage is improving business processes in each business activity and the second is improving business process relationships between each business activity (Yunita, Aditya and Ekaputra, 2021)(Hamzah and Hariyanto, 2021).

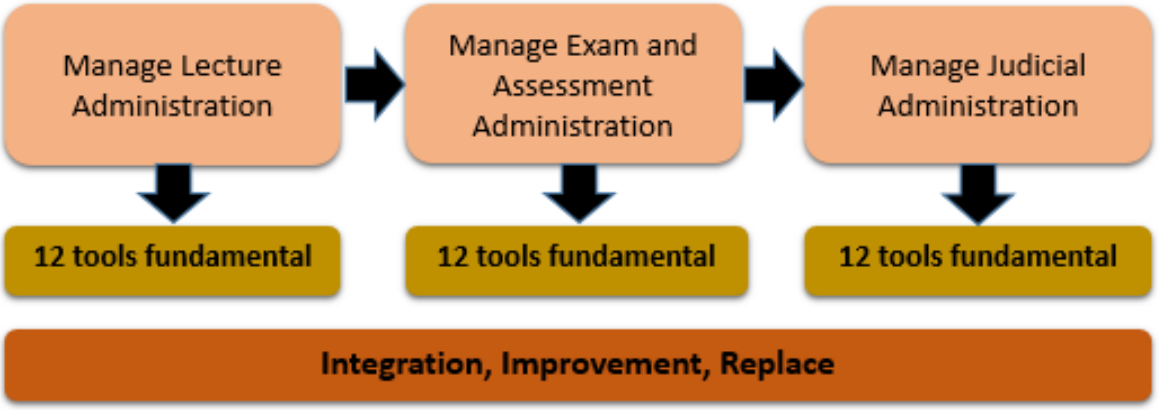

Figure 11. Conceptual Framework for Business Process Improvement

Table 6 shows the results of improving business processes in manage lecture administration activities based on BPI fundamental tools. In this activity, there are four business processes that are being improved, as in Table 6 and Figure 12, which include: 1) Automatic lecturer attendance input; 2) Enter lecturer attendance automatically; 3) Record the attendance of lecturers and students based on the courses taken automatically. 4) Eliminate business processes carried out by general administration staff.

Table 6. Improvement of Business Processes for Manage Lecture Administration Activities

	Business Process	***12 tools fundamental***
1.	Lecturers teach and give assignments	-
2.	Students study and do assignments	-
3.	The lecturer inputs student attendance	*Automation*
4.	General administration inputs lecturer attendance	*Duplication Elimination, Automation*
5.	The Front Office records the presence of lecturers and students	*Automation*

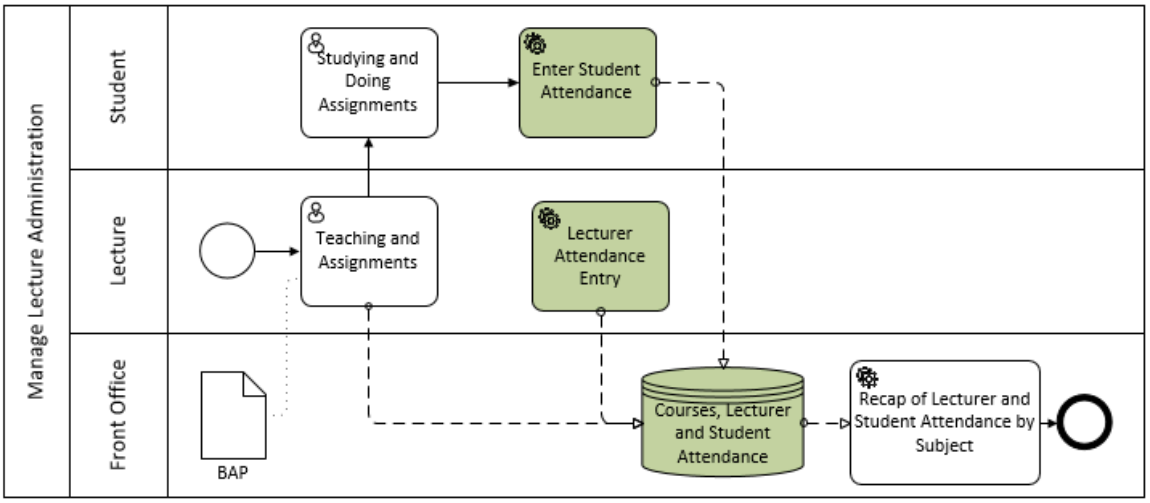

Figure 12. Business Process Improvement in Manage Lecture Administration Activities

Table 7 shows the results of business process improvements in manage exam administration and assessment activities based on BPI fundamental tools. In this activity, there are two business processes that are being improved, as in Table 7 and Figure 13, which include: 1) Creating exam schedules automatically; and 2) Automatic creation of guard schedules.

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Table 7. Improved management of exam and assessment administration

Business Process	*12 tools fundamental*
1. Back Office make an exam schedule	*Automation*
2. Back Office make an exam schedule	*Automation*
3. Back Office Duplicating exam questions	-
4. The exam supervisor oversees the exam process	-
5. Back Office shares exam results to lecturers	-
6. The lecturer carries out the assessment	-
7. The lecturer inputs the grades	-
8. Back office does a grade recap	-

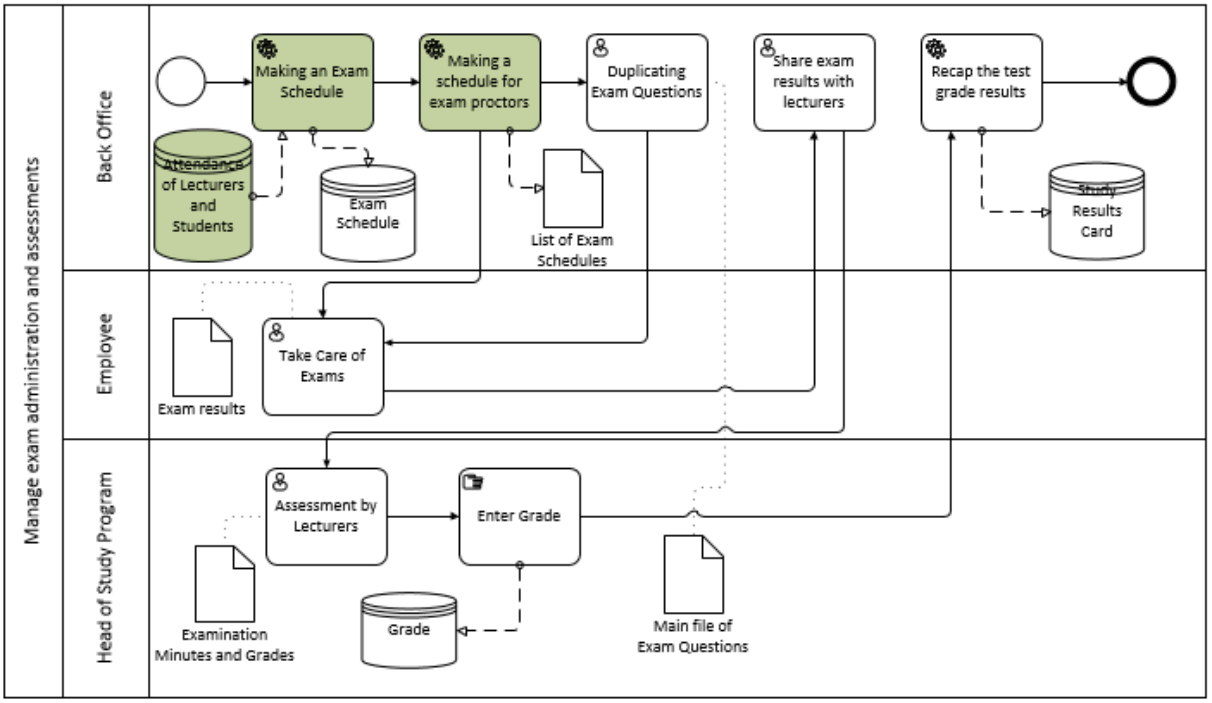

Figure 13. Improvement of Business Processes for Test and Assessment Administration Activities

Table 8 shows the results of business process improvements in judicial administration activities based on BPI's fundamental tools. In this activity, there are 6 business processes that are being improved, as in Table 8 and Figure 14.

Table 8. Improvement of Business Processes for Judicial Administration Activities

Business Process	***12 tools fundamental***
1. *Middle Office* check the judicial requirements	*Automation*
2. *Middle Office* recapitulate judicial data	*Automation*
3. Head of study recapitulate judicial data	*Automation*
4. Head of study Approval of student data affected by drop out	*Automation*
5. *Middle Office* make judicial announcements	*Automation*
6. Middle Office print the drop out letter	*Automation*

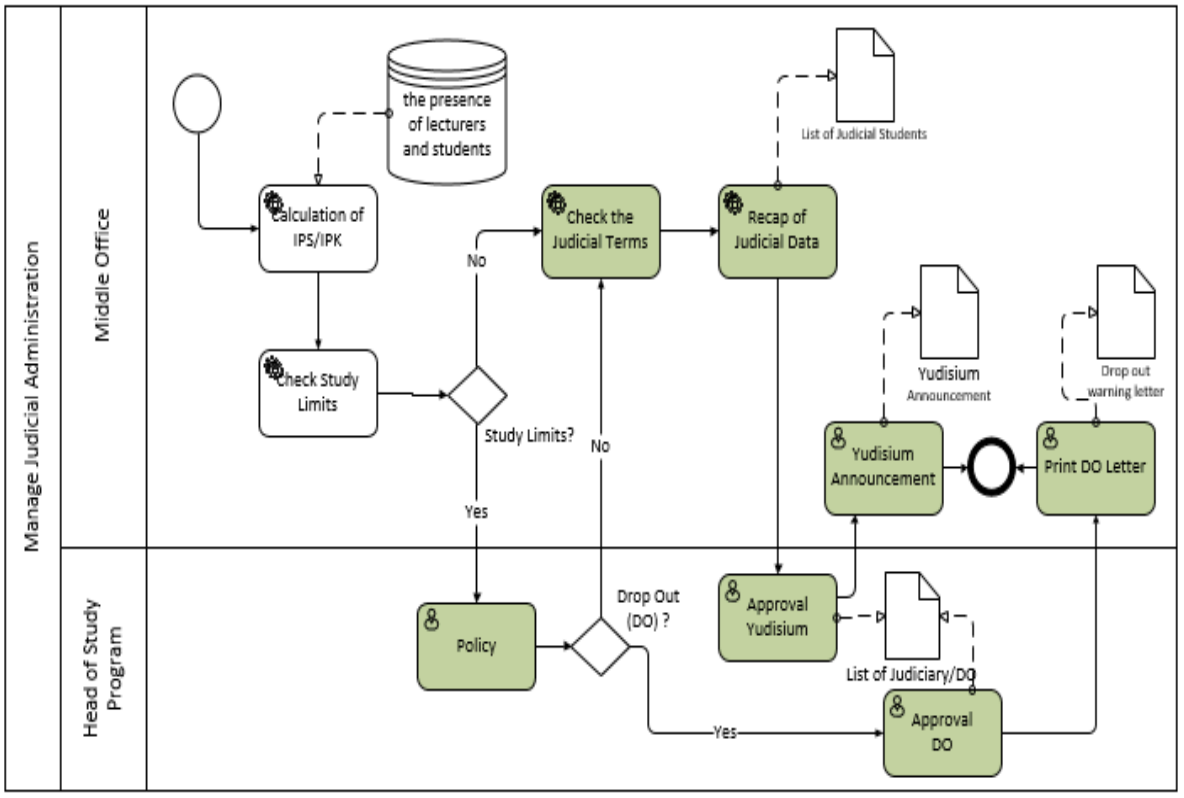

Figure 14. Business Process Improvement in Judicial Administration Activities

Business Process Improvement based on several Activities based on IIR, as in Table 8.

Table 9. Improvement of Business Processes between Activities based on IIR

Activities IIR	Manage Lecture Administration	Manage Exam and Assessment Administration	Manage Judicial Administration
1. Manage Lecture Administration	X	A	no relationship
2. Manage Exam and Assessment Administration	A	X	B
3. Manage Judicial Administration	no relationship	B	X

Explanation:

A. IIR (Manage Lecture Administration dan Manage Exam and Assessment Administration)

I: Integration, namely by integrating the business process of recapitulating student attendance owned by the Manage Lecture Administration activity with the business process of making exam schedules owned by the Manage Exam and Assessment Administration activity. **I:** Improvement is an improvement with technological support that integrates business processes, namely by implementing one database platform. **R:** Replace is the process of improving attendance recapitulation and making exam schedules by generating automatically, where previously there was still user involvement.

B. IIR (Manage Exam and Assessment Administration and Manage Judicial Administration)

I: Integration, namely integrating the business process of recapitulating exam scores for Manage Exam and Assessment Administration activities with checking study limits and judicial requirements for Manage Judicial Administration activities. **I:** Improvement is an improvement with the support of one database platform technology for integrating Manage Exam and Assessment Administration

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activities with Manage Judicial Administration. **R**: Replace is an improvement in the process of recapitulating test scores for Manage Exam and Assessment Administration activities by checking study limits and graduation requirements for Manage Judicial Administration by generating them automatically without involving the user.

3.3. Final Stage Result

At this stage, model verification and validation activities are carried out based on BPI and interview methods. The purpose of verification is to evaluate business process improvement models based on BPI stages or approaches. The results of improvements to business processes according to BPI are appropriate and appropriate, as in Table 10. Meanwhile, validation is evaluating business process improvement models based on the Interview method with the Head of PPTI as an expert. judgment and AAK staff as owners of the business processes used as case studies. The evaluation results of this model are appropriate and precise as in Table 11.

Table 10. Verification Results

	BPI Stage	Theory	Results
1.	*Organizing for Improvement*	Value Chain	Appropriate and Correct
2.	*Understanding the Process*	BPMN dan *Risk Analysis*	Appropriate and Correct
3.	*Streamlining*	12 Fundamental tools for elaboration with IIR	Appropriate and Correct

Table 11. Validation Results

	BPI Stage	Theory	Results
1.	*Organizing for Improvement*	Produces 9 Business Processes	Appropriate and Correct
2.	*Understanding the Process*	Of the 9 Business Processes, modeling has been carried out using BPMN and risk analysis has been carried out on each sub-process of the 9 business processes	Appropriate and Correct
3.	*Streamlining*	The modeling results have been improved using 12 fundamental tools with IIR	Appropriate and Correct

4. Conclusion

Based on these results and discussion, a business process improvement model based on BPI is produced with three stages, namely 1) Determining the scope based on the value chain; 2) Analysis and modeling of business processes using BPMN and Risk Analysis; 3) Improvements to business processes based on 12 fundamental tools and IIR techniques. This model has also been verified and validated based on the BPI stages or approach by the expert judgment of the head of the PPTI section and the business process owner by the AAK section staff.

The verification results of this model conclude that there is compatibility between business processes and BPI stages. Meanwhile, the validation results state that business activities and processes are appropriate and appropriate to the business processes at AAK Dinamika University. Based on the results of verification and validation of this model, this model can be used as a guide in improving business processes both within a business activity and the relationship between business activities. This model can also be used as a basis for analyzing information system design. For further research, business process improvements should be aligned with organizational goals, namely using the key performance indicators (KPI) method. This is done so that every business process improvement is in line with organizational goals.

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