



Business process improvement design for academic administration in supporting the achievement of timely graduates in the master of management study program at the University of North Sumatra

Azharie Wibowo¹, Meilita Tryana Sembiring², Emerson Pascawira Sinulingga³

¹Business Management Study Program, Postgraduate School, Universitas Sumatera Utara, Indonesia

^{2,3} Department of Industrial Engineering, Faculty of Engineering, Universitas Sumatera Utara, Indonesia

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ABSTRACT

This research is based on data on the number of on-time graduates of Prodi MM USU not proportional to the number of active students of Prodi MM USU, still below 50%. The purpose of this research is to identify the current business processes of Prodi MM USU, find out the main causes of the less-than-optimal number of on-time graduates, find recommendations for technical solutions and recommendations for the flow of academic administration business processes, and to see the time efficiency between the current business process and the recommended business process. The business process modelling of MM USU study programme is done with BPMN. Analysis of the factors causing students to graduate not on time was carried out using the discussion and interview method, then analysed with Root Cause Analysis with the 5WH + 1 H method, then formulated technical solutions and recommendations for business process improvement using the Value-Added Assessment (VAA) method. Some technical solutions or recommendations for improvement in business processes are increasing the number of administrative staff personnel proportional to the increase in the number of students, building a supervision system as a monitor and reminder of research limits that have been carried out by students and supervisors. The time analysis conducted obtained time efficiency results of 30.6% in the colloquium seminar process, 10.5% in the results seminar or company seminar process and 12.5% in the thesis examination process.

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Corresponding Author:

Azharie Wibowo,
Business Management Study Program,
Postgraduate School,
Universitas Sumatera Utara. Medan, 20155, Indonesia
Email: jai.fisika@gmail.com

1. INTRODUCTION

Every organization including a study program must have business processes to manage and provide products or services to its customers (Burlton 2001; Jeston 2014). Good and correct business processes can increase productivity, service quality, resource optimization and performance improvement, so that organizational goals are realized (Van Tiem, Moseley, and Dessinger 2012). So that the management of

these business processes can be communicated and understood easily, Business Process Analysis and Modeling (APPB) is needed. Business process analysis is carried out by the organization to evaluate the ongoing business processes, so that improvement areas can be found as a solution for future improvements (Andersen 2007; Harmon 2019).

Efforts that can be made to make it easier to analyze business processes are done through modeling (Castellanos et al. 2004). Business process modeling is a way of describing stakeholder interactions in the system with certain standards (Krogstie and Krogstie 2016; Recker et al. 2009). Modeling is very important because it is used in analyzing business processes that are on target or not, and as a plan for optimizing organizational performance (Laguna and Marklund 2018; Niu et al. 2021). APPB is an understanding of all business processes that occur in the organization. Therefore, in conducting APPB, approaches and methods are used. These approaches and methods can help in making solutions to business process problems, these solutions are in the form of recommendations using improvement techniques provided by these approaches and methods (Harmon 2019; dos Santos Garcia et al. 2019).

Business process models in higher education institutions must pay attention to the effectiveness and efficiency of work relationships between organizational units (Balzer 2020; Joseph and Gaba 2020). By modeling business processes, a study program at a university or higher education institution can identify, document, and communicate problems (such as bottlenecks, critical paths, or queues) systematically to stakeholders (Ramdani, 2015). As one of the study programs at the University of North Sumatra, Master of Management is certainly obliged to comply with these regulations.

The business processes run by the USU MM Study Program so far consist of three core parts, namely: management process, core process and supporting process. In the management process, the USU MM Study Program applies to two categories, namely the first as target management, namely: planning and objectives (vision, mission, policies, strategic plan, and renop), and second as SMOP control, which consists of: document control, internal audit, and management review. While the core process is the educational process where prospective students enter the student admission process by the student and alumni unit, then proceed to the teaching and learning preparation process (PBM), in the implementation of PBM there are curriculum preparation activities in it. Then proceed to the learning evaluation process still by the PBM subunit and continue to the graduation registration service still carried out by the PBM subunit. The last is the supporting process, where the core of this supporting process is procurement, starting from the provision of human resources, the provision of infrastructure facilities and material management by the administrative subunit. Especially the process of procurement or provision of facilities in the USU MM Study Program involves USU third parties or partners supervised by the Postgraduate School.

Student academic performance is one aspect of assessing the success and feasibility of a study program in providing higher education. Assessment indicators involving students include the ratio of the number of applicants to those who pass the selection, the percentage of students who re-register, the average student GPA, academic and non-academic achievements achieved during college, and also the percentage of on-time graduation (BAN-PT, 2019). The timeliness of student graduation is one of the things that must be considered by universities and study programs as implementing units of higher education.

The timeliness of student graduation has different criteria for each program available at the tertiary level. D3 program students are said to graduate on time if they can complete their studies in less than or equal to three years. S1 program students are said to graduate on time if they can complete their studies in less than or equal to four years. Likewise, students in the S2 program are said to graduate on time if they can complete less than or equal to two years of study and the S3 program if they can complete less than or equal to three years of study.

Many things can affect the length of the student study period, both internal factors (student interest, motivation and ability) and external factors (study program environment, region of origin and school origin). Different student characteristics make the length of the student study period also vary.

This becomes interesting to study as a form of effort to improve the quality of graduates in the future and can also be an anticipatory step to increase the number of study failures or drop out (DO).

Based on the results of research by Putra, et al (2014) that the factors that influence the length of study period (graduation) of students are as follows: 1) Student self-concept is positive, 2) Student satisfaction with faculty, lecturer, and employee services is also good, 3) The more dominant factors are factors from within students which include: difficulty finding problems and determining research titles (11.36%), difficulty writing (27.27%), difficulty finding references and literature supporting theory (6.81%), colliding with work (9.09%), fear or embarrassment of guidance (13.63%), laziness to complete studies (13.63%). However, there is one external factor that is influential, namely the strict discipline of lecturers enforcing lecture rules. Lecturers' attendance is strict, so those who do not attend lectures 4 times without clear reasons are declared not to graduate (18.18%). Lazy students are often tripped up for this reason.

Safrudin's (2006) research on factors affecting the success of Bogor Agricultural University students concluded that students with a combination of high GPA and fast study period only reached 4.7 percent. Working students generally obtain lower GPA and longer study period. Students who come from management diploma obtain higher GPA and shorter study period. Students who live in rented rooms have higher GPAs and shorter study periods. Parents' education has little effect on students' GPA and study period. Students aged 22 years or less have a higher GPA and shorter study period. Female students have higher GPAs and shorter study periods. Married students have a lower GPA and a longer study period.

The results of Asmawi's research (2005), related to the strategy of increasing quality graduates in higher education, can be concluded, among others: 1) Higher education managers need to encourage efforts to improve the qualifications of lecturers with further education to S2 and S3 or campus activities with adequate facilities so that the quality of resources can be improved so that it will automatically encourage an increase in the quality of education in higher education, 2) The demand for the quality of education continues to be improved as an effort to create quality output (graduates) who are ready to enter the labor market and to meet national education standards, 3). Output (graduates) produced must be based on a mature process and supported by good input (students) as well, 4) Synergy cooperation in supporting the implementation process and higher education resources to improve the quality of education must receive the attention of the government, business / industry, and education managers.

In table 1, data on the number of registered students vs. the number of graduates of each batch in the USU MM study program is presented.

Table 1. Number of registered students vs. number of graduates per batch in MM USU study program

No	Batch	Number of Student	Number of Graduates	% Graduation
1	Reg 48-1	27	18	67%
2	Reg 48-2	28	22	79%
3	Eks 27	22	13	59%
4	Reg 49-1	25	18	72%
5	Reg 49-2	25	18	72%
6	Eks 28	16	12	75%
7	Reg 50	26	16	62%
8	Eks 29	15	13	87%
9	Reg 51	31	18	58%
10	Eks 30	14	8	57%

Source: Master of Management, 2023

From table 1. The majority of MM USU Study Program students pass the percentage below 80%, only in one batch that has just touched the 87% mark, namely in the 29th Executive batch of 2021. If guided by the Guidelines for Monitoring and Evaluation of Academic PT Accreditation Ratings issued by BAN

PT 2021, the highest score is 4 in the indicator Percentage of study success for each graduation rate program is more or equal to 85% in education programs.

Table 2 is the data on the number of graduates of the USU MM study program broken down to compare between the two regular and executive classes, both the number admitted and the number who graduated on time.

Table 2. Number of active student's vs On-time Graduate in MM USU study program

Semester/year	Aktive		Graduate on Time	
	Regular	Executive	Regular	Executive
Odd/2018	50	10	1	1
Even/2018	22	13	4	1
Odd /2019	35	20	4	3
Even /2019	28	14	2	1
Odd /2020	55	22	20	2
Even /2020	50	16	12	6
Odd /2021	25	16	7	10

Source: Master of Management, 2023

In table 2, the number of students who graduate on time is very disproportionate to the number of active students in each batch. Based on the facts of the number of on-time graduates of Prodi MM USU and the results of previous research studies, researchers are interested in conducting research on the design of business process improvements in Prodi MM USU with the hope that this business process improvement design can help make the number of on-time graduates of Prodi MM USU increase. The design of business process improvements in Prodi MM USU is expected to have an impact on factors that affect the completion of student studies on time, namely: student satisfaction with faculty, lecturer, and employee services, difficulty finding problems and determining research titles, difficulty finding references and supporting theoretical literature.

The research will focus on the core processes of the USU MM Study Program business processes that can increase the number of on-time graduates, namely the colloquium seminar business process, the results seminar or company seminar business process and the thesis trial business process. The design of improvements in the three business processes is expected to provide a supporting factor for timely graduates because timely graduation of students has a close relationship with the accreditation of the study program. The percentage of students who graduate on time is one of the criteria in the assessment of study program accreditation, because this is considered an indicator of whether the established learning process standards have been met.

2. RESEARCH METHOD

This research is a type of qualitative research using the case study method (Heale and Twycross 2018; Priya 2021; Schoch 2020). The object of research in this study is the MM Study Program at the University of North Sumatra which focuses on students, administrative staff, lecturers and the Head of the Study Program.

Sources and Types of Data

In qualitative research, primary data is obtained through interview techniques to a number of informants who are considered to know the real problems (Moser and Korstjens 2018; Solarino and Aguinis 2021). The interviews carried out in this study were semi-structured interviews. The purpose of semi-structured interviews is to find problems more openly (Adeoye-Olatunde and Olenik 2021; Ahlin 2019). In addition, researchers can also obtain information through information and opinions from informants. Meanwhile, secondary data is from literature sources and other references, such as articles, journals, or documentation owned by the USU MM Study Program which are considered relevant to the topic being studied and can fully support this research.

Data Collection Technique

Data collection techniques are carried out to facilitate researchers in obtaining valid and reliable data(Archibald et al. 2019). In this study, data collection will be carried out where the respondent will be the helpdesk who is directly related to handling customer complaints. In this study, the data collection method is observation, interview, questionnaire, and questionnaire.

Data Analysis and Discussion Techniques

Next, researchers will identify business process architecture using the process landscape model method(Fischer et al. 2020; Reijers 2021). Furthermore, the process is carried out to describe the relationship between business processes, researchers use the decomposition method(Laguna and Marklund 2018). In the next stage, modeling of current business processes is carried out using BPMN notation. Analysis of business process problems is carried out using the Root Cause Analysis (RCA) method. Root cause modeling will be described with the 5W + 1H technique.

In addition, an evaluation is also carried out by analyzing activities using one of the streamlining tools from BPI, namely ValueAdded Assessment(Syarifudin, Izzuddin, and Amaliyah 2022). The results of the analysis and evaluation will be used to design business process recommendations using streamlining tools from the BPI method. The design results will be modeled with BPMN, then enter the next stage, namely business process simulation. Business process simulation is run with Bizagi Modeler software. The simulation process carried out is Time Analysis(Bandura 2021; Laguna and Marklund 2018). This simulation can simulate business processes with a real time scale, so as to provide an overview of the recommended business processes that will be applied to the USU MM Study Program. In the last stage, the author draws conclusions based on the research that has been done.

3. RESULTS AND DISCUSSIONS

Business Process Identification

Based on the results of field observations, this study reveals that the main academic administration business processes of the USU MM Study Program which play a very large role in the results of on-time graduates consist of three business processes, namely: Colloquium Business Process, Result Seminar or Company Seminar Business Process and Thesis Examination Business Process. The following are the results of research in the form of modeling the main academic administration business processes of MM USU Study Program.

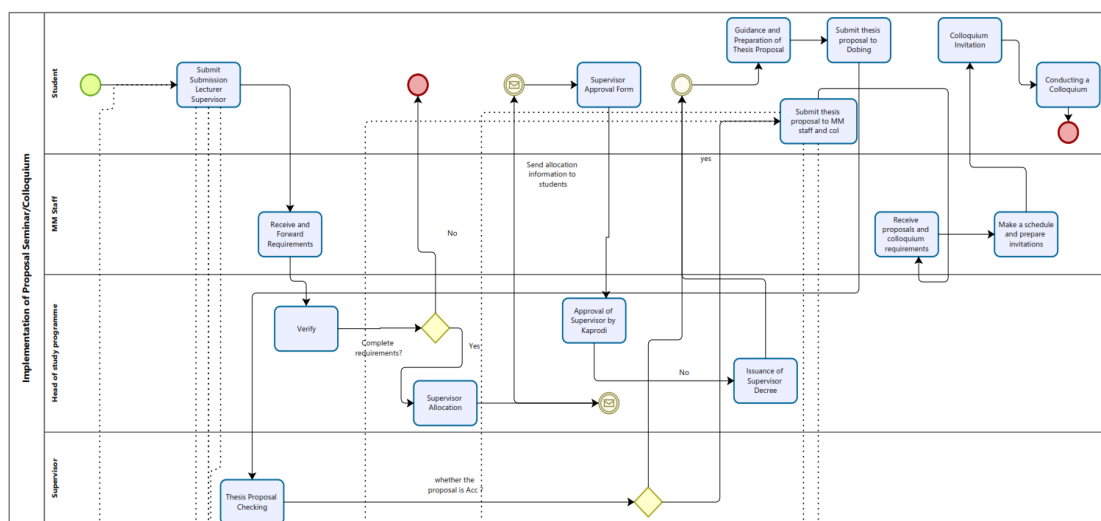


Figure 1. BPMN of Colloquium Seminar

Figure 1 shows the results of modeling the colloquium business process with BPMN based on the existing flow (as is) showing that there are 15 activities that run on these activities, with 4 actors involved, namely students, MM administrative staff, Head of MM USU, and Supervisors. The current colloquium seminar business process (as is) can be seen that most activities in the business process are still carried out manually, there are only 2 activities as user tasks. In this study, a response time breakdown was also carried out for each activity described in table 3.

Table 3. Response Time of Colloquium Seminar

No	Activities	Respon Time
1	Submitting the application for a supervisor	1 Day
2	Receive and Forward Requirements	1 Day
3	Verification and allocation of supervisors	1 Day
4	Make the Supervisor Approval form	1 Day
5	Approval of Supervising Lecturer by Kaprodi	1 Day
6	Issuance of Supervisor Decree	10 day
7	Guidance and Preparation of Thesis Proposal	30 day
8	Submitting the thesis proposal and colloquium requirements to the supervisor	1 Day
9	Checking the Thesis Proposal	3 Day
10	Submitting thesis proposal to MM staff and colloquium requirements	1 Day
11	Receiving colloquium requirements and making colloquium invitations	10 day
12	Conducting colloquium	1 Day

Source: Master of Management, 2023

In the results of the breakdown of the colloquium seminar response time above, it can be seen that the amount of time required by a student to complete all activities in the colloquium seminar business process is 61 days or around 2 months, then after completing the colloquium seminar students enter the business process stage of the results seminar or company seminar. BPMN modeling of the results seminar or company seminar business process can be seen in Figure 2.

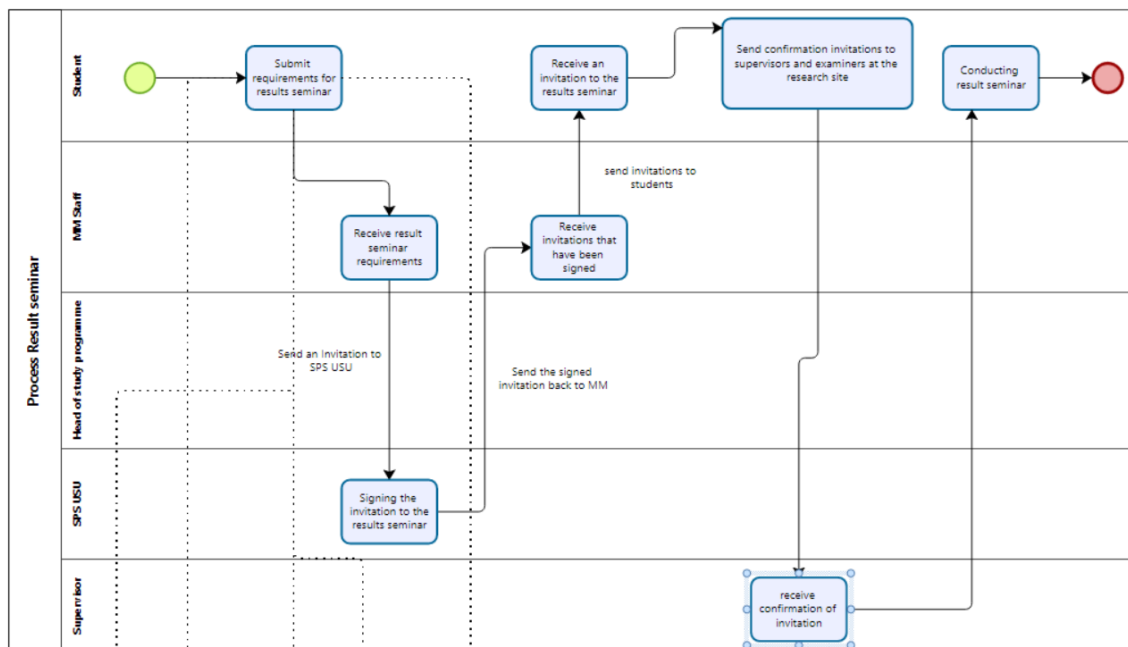


Figure 2. BPMN of Result Seminar

In Figure 2, the results seminar business process has 9 activities that run with 5 actors involved, namely students, MM staff, Head of MM USU, USU SPS Staff and Supervisors. The current results seminar

business process (as is) can be seen that all activities in the business process are carried out manually. In this study, the response time breakdown for each activity is also described in table 4.

Table 4. Response Time of Result Seminar or Company Seminar

No	Activities	Respon Time
1	Conduct mentorship and research	60 days
2	Submit the requirements for the result seminar	1 day
3	Receiving the requirements for the result seminar	1 day
4	Signing the invitation for the results seminar	10 days
5	Receive the invitation that has been signed	1 day
6	Receive the invitation for the results seminar and forward it to the supervisor	3 days
7	Receive confirmation of invitation	1 day
8	Conduct result seminar or company seminar	2 days

Source: Master of Management, 2023

In the breakdown of response timetable 4, it can be seen that a student from after completing the colloquium seminar to the company seminar stage takes a maximum of 79 days. The total time required by a student from the beginning of the stage of applying for a supervisor to the stage of conducting a company seminar means a total of 140 days or around 4 months. Furthermore, students enter the thesis examination stage whose modeling is shown in Figure 3.

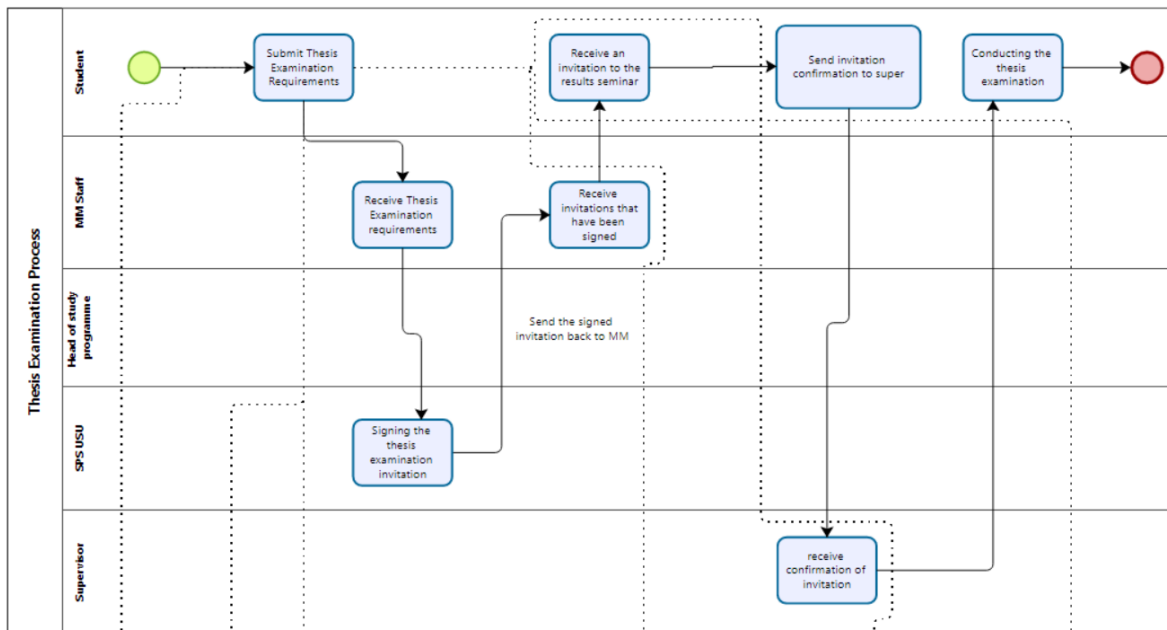


Figure 3. BPMN of Thesis Session

In the thesis trial business process, there are also 9 activities that run on these activities, with 5 actors involved, namely students, MM staff, Head of MM USU, USU SPS Staff and Supervisors. The current thesis trial business process (as is) can be seen that all activities in the business process are carried out manually. In this study, the response time breakdown for each activity is also described in table 5.

Table 5. Response Time of Thesis Session

No	Activities	Respon Time
1	Make revisions or improvements after the results seminar	14 days
1	Submit thesis requirements	1 day
2	Receive the requirements for the thesis session	1 day
3	Signing the invitation for the thesis session	10 days
4	Receive the invitation that has been signed	1 day
5	Receive the invitation to the thesis session and forward it to the Supervisor and Examiner	3 days
6	Receive confirmation of invitation	1 day
7	Conduct the thesis trial	1 day

Source: Master of Management, 2023

In the breakdown of response timetable 5, it can be seen that a student from after completing the results seminar to the longest thesis session, takes 32 days. The total time required for a student from the initial stage of applying for a supervisor to the stage of conducting a thesis session is 171 days or around 5.5 months or close to 1 semester (6 months).

Analysis Results

Based on the data obtained, the number of on-time graduates of MM USU Study Program has increased, but the percentage of on-time graduates compared to the number of active students still does not meet the standards set by Ban PT, which is to meet the figure of 50% on-time graduates. The following is a diagram of the percentage of on-time graduates of USU MM Study Program students:

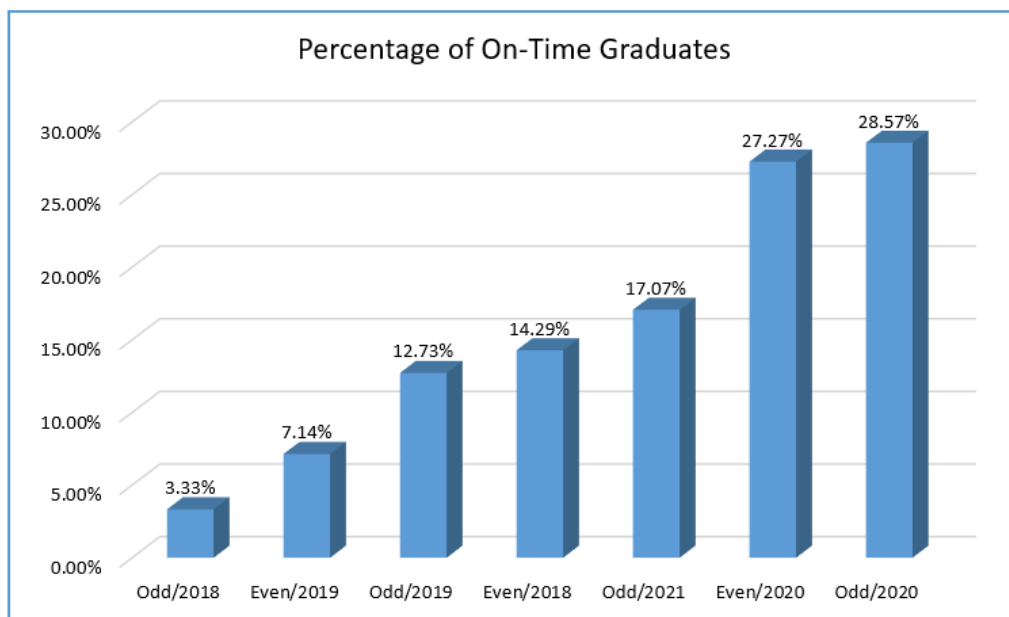


Figure 4. Diagram of Percentage of On-Time Graduates of MM USU Study Program

In Figure 4, there is an increase in the number of on-time graduates from 2018 to 2020. To find out the problem factors that cause graduates not to be on time, researchers conducted a survey by distributing questionnaires. Respondents of this questionnaire consisted of students from the class of 2000 to the class of 2022. The questionnaire sorts out two important things that will be sought for the type of problem, namely the administrative business process and the performance of the administrative staff, and the second is the factor of the supervisor and the students themselves. In the study, it was found that the first part of the problem, namely the performance and flow of the USU MM Study Program administration, was obtained as shown in the following histogram:

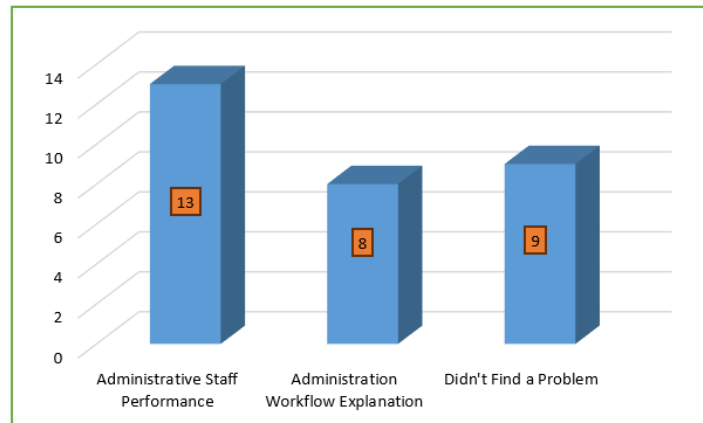


Figure 5. Histogram of Problem Group I of MM USU Study Program

In Figure 5, the performance of administrative staff and the explanation of administrative workflows have a major influence on the problem of graduates not being on time, namely 43% and 27% respectively. In the second part of the questionnaire to see if there are factors from the supervisor can be seen in Figure 6.



Figure 6. Histogram of Problem Group II of MM USU Study Program

In Figure 6, the influence of the problem on the supervisor is not too great, it can be said that the supervisor has carried out duties and obligations that really help students graduate on time. This study also looked deeper into the root causes of students graduating not on time, analyzing the causes of the problem were sought with Root Cause Analysis (RCA) using 5W + 1H analysis.

Recommendations for Business Process Improvement

Based on the results of the 5WH + 1H analysis and evaluation of the Value-Added Assessment (VAA) method above, several technical proposals were obtained in the framework of the design of business process improvements in order to produce an increase in graduates on time, namely: 1.) By improving communication and coordination between administrative teams through regular meetings, effective use of communication tools, and clear organization of duties and responsibilities. 2.)

Conducting a comprehensive and proportional analysis of the needs of administrative staff and preparing adequate human resource planning. 3.) Conduct a thorough evaluation of the research conducted by students who have passed the graduation period on time and provide direction in order to increase the graduation rate of MM USU Study Program. 4.) Design and implement an effective performance monitoring and recognition system for administrative staff. 5.) Develop and implement an online service system to make it easier for students to understand the flow of business processes and find a place to overcome the obstacles faced by students.

The Business Process Flow of the Master of Management Study Program at the University of North Sumatra is also recommended to be improved using BPMN, before improvements are made to BPMN, the business process is analyzed for corrective actions for each activity of the Colloquium Business Process, the business process of the results seminar or Company seminar and the thesis session business process, as shown in table 6, table 7 and table 8 respectively.

Table 6. Results of corrective actions for Colloquium Business Process activities

No	Activities	Type of Action
1	Submitting supervisor submission	Upgrading
2	Receiving and Forwarding Requirements	Upgrading
3	Verification and Allocation of supervisors	Upgrading
4	Making Supervisor Approval form	Upgrading
5	Approval of the Supervising Lecturer by the Head of Study Programme	Upgrading
6	Issuance of Supervisor Decree	Upgrading
7	Guidance and Preparation of Thesis Proposal	Upgrading
8	Submitting the thesis proposal and colloquium requirements to the supervisor	Upgrading
9	Checking the Thesis Proposal	Upgrading
10	Submitting thesis proposal to MM staff and colloquium requirements	Upgrading
11	Receiving colloquium requirements and making colloquium invitations	Upgrading

Table 7. Results of corrective actions for Seminar Business Process activities

No	Activities	Type of Action
1	Submit the requirements for the results seminar	Upgrading
2	Receiving the requirements for the result seminar	Upgrading
3	Signing the invitation for the result seminar	Upgrading
4	Receive the invitation that has been signed	automation
5	Receive the invitation for the results seminar and forward it to the supervisor	automation
6	Receive confirmation of invitation	automation

Table 8. Results of corrective actions for thesis trial Business Process activities

No	Activities	Type of Action
1	Submit Thesis Examination Requirements	Upgrading
2	Receive the result seminar requirements	Upgrading
3	Signing the thesis examination invitation	Upgrading
4	Receive the invitation that has been signed	automation
5	Receive the thesis examination invitation and forward it to the Supervisor and Examiner	automation
6	Receive confirmation of invitation	automation

Based on the recommendations of the above actions, the BPMN design for the business processes of colloquium seminars, results seminars or company seminars and thesis sessions as shown in Figure 7, Figure 8 and Figure 9 respectively.

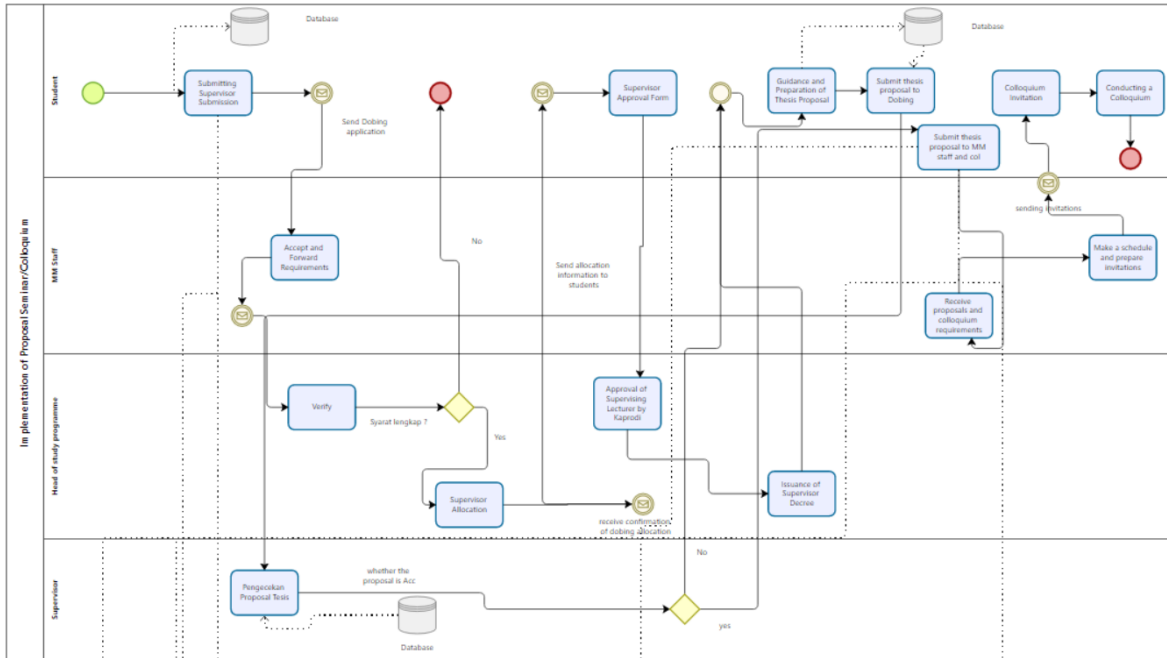


Figure 7. Recommended BPMN Improvements for Colloquium Seminar Business Processes

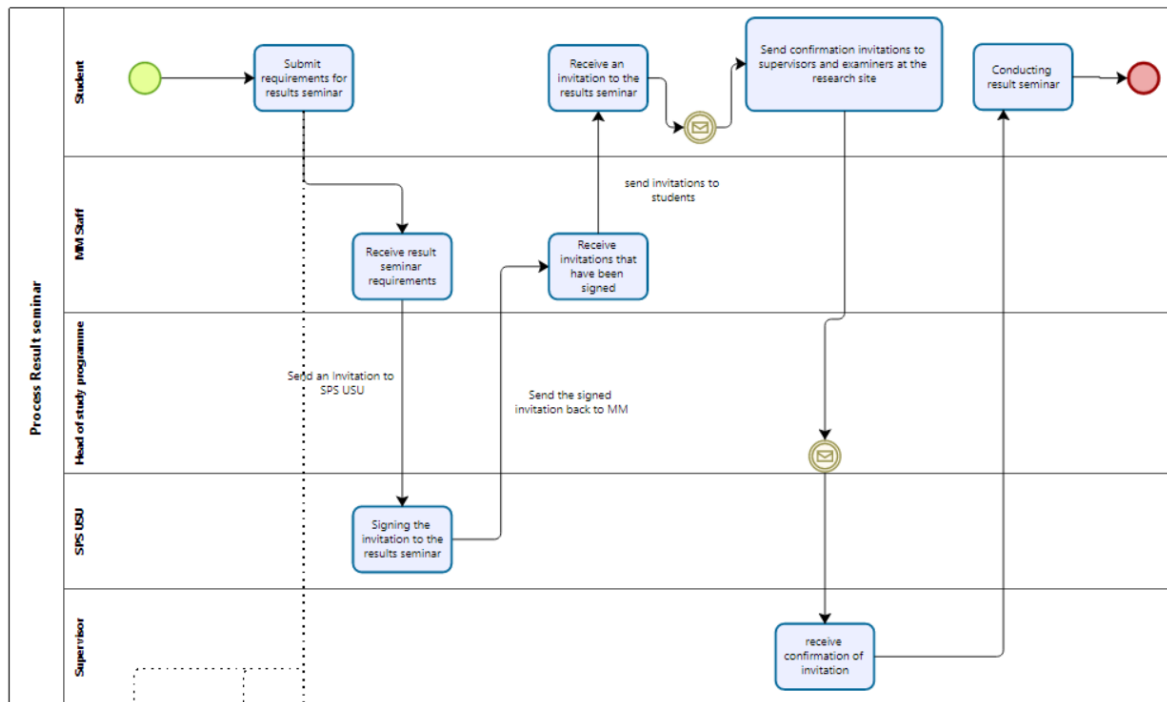


Figure 8. BPMN Improvement Recommendation for the Result Seminar or Company Seminar Process

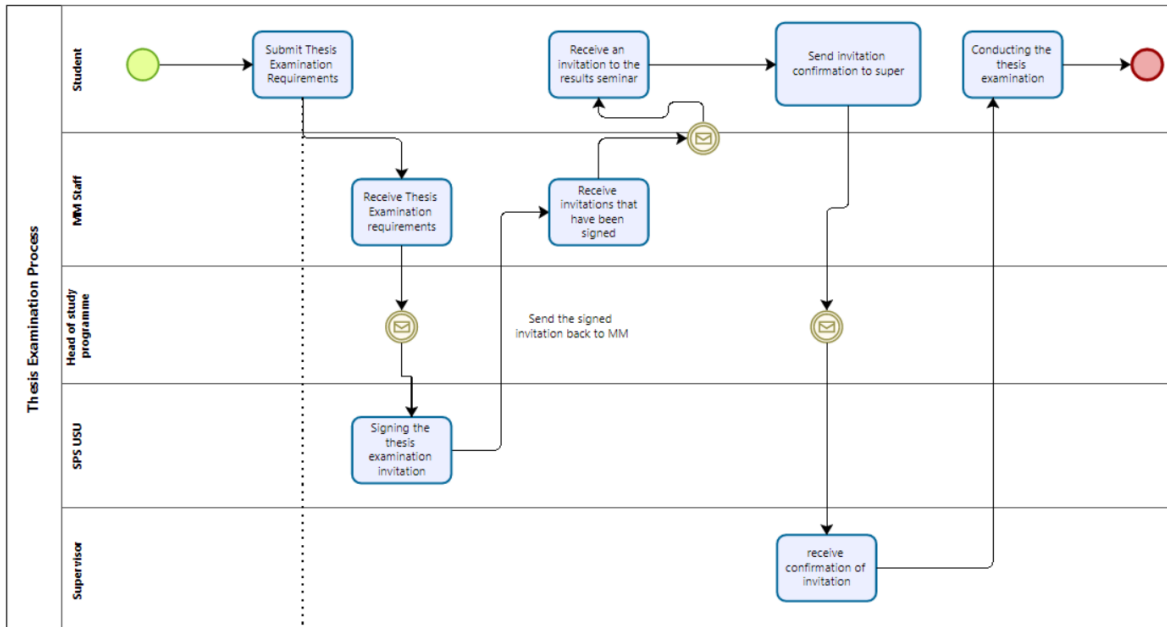


Figure 9. BPMN Improvement Recommendations for the Thesis Session Process

In this research, the business process simulation stage is also carried out by simulating time analysis on business processes (as-is) with processes (to-be). The simulation is run to find out how much time it takes to complete the business process flow in both processes. From the Time Analysis simulation results that have been obtained, a time comparison will be made whether the recommended business process (to-be) is more efficient than the current business process (as-is) or not.

In the simulation scenario, the estimated number of students is 15 people, with each response time for each activity having been adjusted to the standard response time of the USU MM Study Program. Table 9 will show the results of the simulation time analysis on the USU MM Study Program's current academic administration Business Process (as-is) with the recommended business process (to-be) and the time efficiency obtained.

Table 9. Time Simulation Comparison Results

Time Analysis Total Time (m)	Currently (as is)	Recommendation (to be)	Efficiency
	Menit	Menit	%
Colloquium Seminar Business Process	255,120	177,120	30.6%
Results Seminar Process	410,400	367,200	10.5%
Thesis Examination Process	518,400	453,600	12.5%

4. CONCLUSION

Some of the factors that prevent graduates from graduating on time can be summarized as follows: 1.) Lack of Responsiveness of the USU MM Study Program administration team in serving student needs, Lack of clear flow or academic administration workflow applied to help students graduate on time, Still lack of student motivation in pursuing timely graduation, Lack of responsiveness or difficulty in contacting supervisors to conduct research guidance. Then after finding the potential problem, an improvement is made to the business process using the BPI (Business Process Improvement) method, which is to improve the performance of the process and also to overcome the problem. The improvement is based on the analysis of each activity and the design of the business process using streamlining. 2.) Business process recommendations were made by analysis and deep interviews to find technical solutions that must be implemented in order to improve graduates on time, while the main business process recommendations were modeled using BPMN (Business Process Model and

Notation). After analysis and modeling, a simulation was carried out to compare the previous business process (As-Is) with the recommended business process (To-Be) to determine the comparison of the two using Time Analysis. After the comparison, it is found that the current business process (As-Is) has improved. In the colloquium seminar business process, the total time increased by 30.6%, the results seminar business process by 10.5%, and the thesis examination business process by 12.5%. Apart from the increased time, there are also several problems that can be solved from the potential problems that exist in the current business process (As-Is).

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