

A-4-2

# **Business Process Improvement in Information Flows with the Implementation of Administrative Workflow Concept and Application**

## **---Case Study: Department of Informatics Engineering Faculty of Engineering , Widyatama University<sup>1</sup>**

Benny Yustim<sup>2</sup>

### **Abstract**

Widyatama University as a private university should know that its customer wants a better service. To give the best service and increased satisfaction to the customer, it should change and improve the traditional management and the way of thinking, especially in its bureaucracy. It should give customers not only the quality (doing the job right every time) but also the perfection (doing the right job right every time).

To accomplish that mission, Widyatama University should be doing Business Process Improvement (BPI). BPI is a systematic methodology developed to help an organization make significant advances in the way its business process operates. There are 3 major objectives of BPI: effectiveness, efficiency and adaptability.

This research focuses on the improvement of distribution functions in the informatics department especially on information flows. To support the improvement, we implement the administrative workflow concept and develop its application. This concept and application will maximize the use of Local Area Network (LAN) and open source software.

BPI with implementation workflow concept and application has the following goals: to improve reliability of business processes information, to improve response time, to decrease cost, to reduce inventories, to increase profits and to reduce bureaucracy.

**Key Words:** workflow, effectiveness, efficiency, Business Process Improvement (BPI)

### **Introduction**

Companies which run business processes will try to get them improved in order to increase company performance. The improvement of processes should have a positive effect on the organization, especially on cost and time to complete a specific business process. However, companies should realize that improvements are limited by a limitation of resources within company.

<sup>1</sup> Presented at the 4<sup>th</sup> SEAAIR Forum "The Entrepreneurial University of the 21<sup>st</sup> Century" held in Wenzhou, PRC, 21-23 September 2004

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Information technology has grown fast these days. This situation creates new phenomena on business process improvement within organization. This situation is used by information system experts to give a positive contribution to solve problems on organization. Information technology gives a new solution to the problem on organization.

The implementation of information system is not a short cut to solve the problems faced by organization. It needs a big commitment from all components within the organization, especially from top management. Without it, the implementation of information system will fail and waste cost and time.

The improvement on company performance will have to be done by every company, including companies which have businesses in the higher education industries. It will increase satisfaction to people who use their services.

This paper will discuss efforts needed to improve performance in the higher education industry, especially on handling administration in the Informatics Department. One of the biggest costs in higher education industry is the cost used for paper; meanwhile the use of computer technology cannot reach a maximum capacity. The main purpose of this research is to reduce the use of paper and improve the use of computer technology in business process.

This research will study the current system in several ways, and try to get better solutions with maximizing the use of existing resources. Improvement in business process will be supported by workflow concept and application. For implementation needs, it will use open source software to minimize the cost.

## **SWOT Analysis**

Before the research starts, it is recommended to do a SWOT analysis in order to assess the proposal's Strength, Weakness, Opportunity and Threats of current systems.

### **Strength:**

#### **a. Computer system**

Good computer with latest technology

#### **b. Local Area Network & Internet**

All computers in informatics dept are connected to LAN

### **Weakness:**

#### **Business Processing**

#### **a. Traditional Business Process**

Too much bureaucracy

#### **b. No trust in the electronic documents**

All documents should be on hard copy and have signature

#### **c. Low Integrated & Sharing Resources**

No document or files sharing on main server

### **Opportunity:**

- a. Chance to access local server (department server)
- b. Chance to integrate all resources in informatics department
- c. Join research between lectures and under graduate students
- d. A solution for rule on efficiency resources

Threats:

Service from Information Technology Center

- a. Unpredictable Down Time

Internet/proxy, pop3, SMTP, LAN – almost 20% of work hours every month

- b. Limited access to outside world

Too much protection

- c. Poor LAN design & implementation

- d. Wrong man in the wrong place.

Company Rule

- e. Budget on resources has been reduced

## Current System Analysis

The development of information system should start with analyzing the current system. There are several methods used to analyze the current system. This research will use Geographic Flowchart and Functional Flowchart.

### Geographic Flowchart

Geographic Flowchart has a purpose to analyze the physical flow of activity; it helps minimize the time wasted while working output and/ or resources are moved between activities [2]. This condition cannot be changed immediately, because of limitation of existing rooms.

Current system, works in three different floors, which is:

- a. Ground Floor

Ground floor (Figure 1) is used to duplicate document process before being distributed to functional areas in organization.

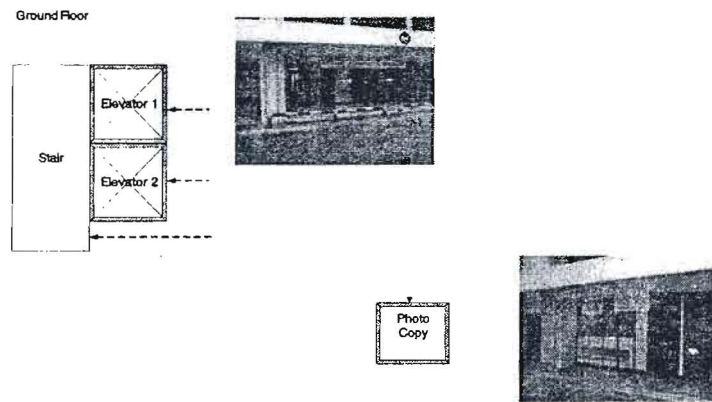


Figure 1: Ground Floor

**b. Second Floor**

Second floor (Figure 2) is the place where dept head, dept secretary, lecturers and faculty secretary work. This floor is important for all processes in current system. Numbering and distribution of letters will go through this floor.

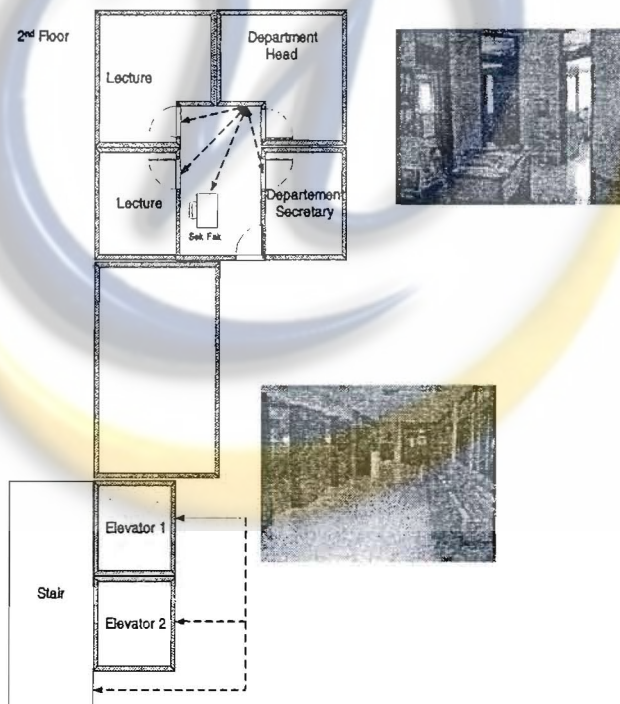


Figure 2: Second Floor

**c. Fourth Floor**

Most of informatics dept lectures and labs are on this floor. This condition makes the distribution process of the current system taking too much time.

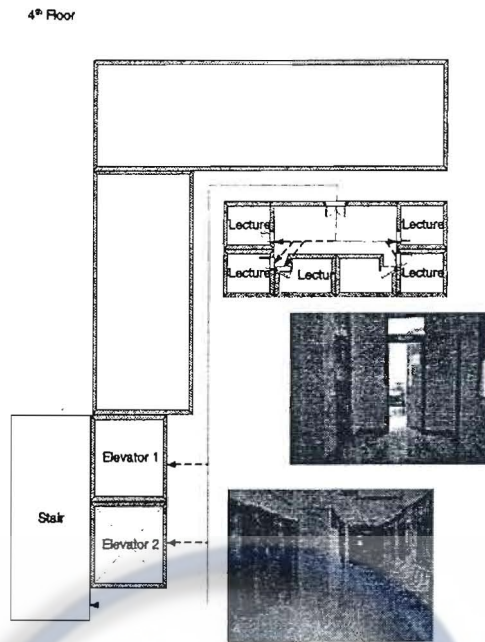


Figure 3: Fourth Floor

### Functional Flowchart

Functional Flowchart is used to give a view about how much money an organization is losing because the process is not efficient and effective [2]. The business process will separate in two processes, namely:

#### a. Request and Approval Letter (general)

Request and approval letter (Figure 4) are represented by a process used by the dept head. Actually this process is the same as request and approval letter in other functional informatics dept.

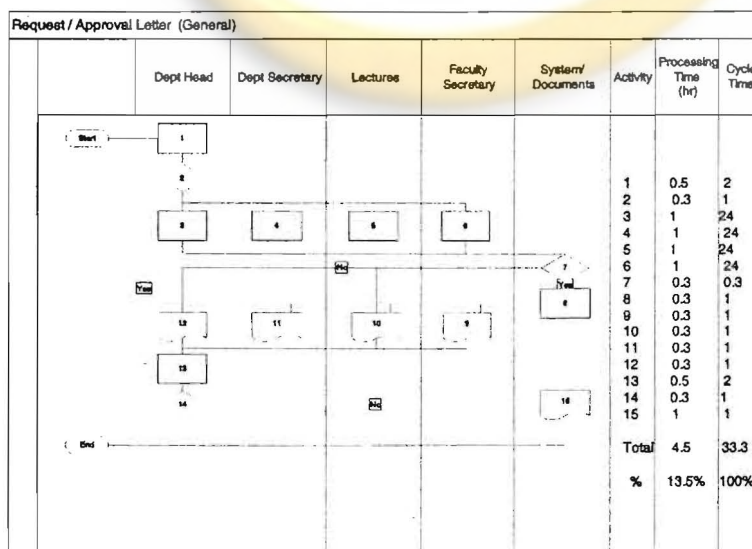


Figure 4: Request / Approval Letter (general)

b. Delivery

The delivery process (Figure 5) will be used to distribute the letter from and to outside informatics dept. This process is organized by a faculty secretary.

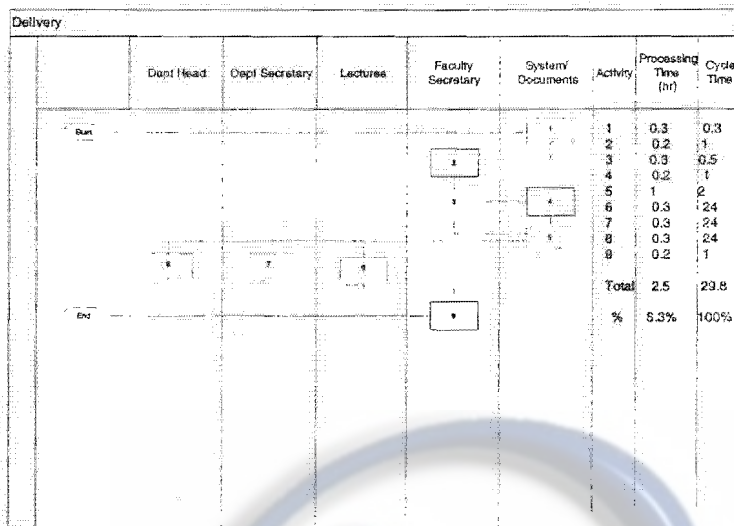


Figure 5: Request / Approval Letter (general)

Processing Time (hr) column shows the time required to perform the activity and the Cycle Time (hr) column shows the times between the completion of previous activities and that of the current activities [2].

In Figure 4 and 5, there are groups with different colors (activity, processing time and cycle time). This shows that processes could be chosen depending on functional organization and count only just one time for each group. All process involved in Figures 4 and 5 are shown in Table 1.

Request / Approval Letter (General)			Delivery		
No	Activity	Responsible Area	No	Activity	Responsible Area
1	Need of Letter for activity on department	Dept Head	1	Documents Receive	System/Documents
2	Decision on person Incharge	Dept Head	2	Documents Processing	Faculty Secretary
3	Make a letter for activity	Dept Head	3	Decission to Documents Numbering	Faculty Secretary
4	Make a letter for activity	Dept Secretary	4	Documents Numbering	System/Documents
5	Make a letter for activity	Lectures	5	Letter documentation & Duplicate (Photo Copy)	System/Documents
6	Make a letter for activity	Faculty Secretary	6	Lectures Documents	Lectures
7	Decision on Letter numbering	System	7	Department Secretary Documents	Dept Secretary
8	Letter numbering	System	8	Department Head Documents	Dept Head
9	Letter Print as Hard Copy	Documents	9	Approval on Documents Receive	Faculty Secretary
10	Letter Print as Hard Copy	Documents			
11	Letter Print as Hard Copy	Documents			
12	Letter Print as Hard Copy	Documents			
13	Check a letter for approval	Dept Head			
14	Decision approval or need for revision on a letter	Dept Head			
15	Letter documentation	Documents			

Table 1: Functional Flowchart Process

## Resources Used

Figure 6 shows resources used on administration business process in the Informatics Dept. Paper reducing will focus on zones with red color, because the use of paper in this zone has less priority than zone with blue color. If the confidence on e-document increases the use of paper on zone with blue color could reduce also.

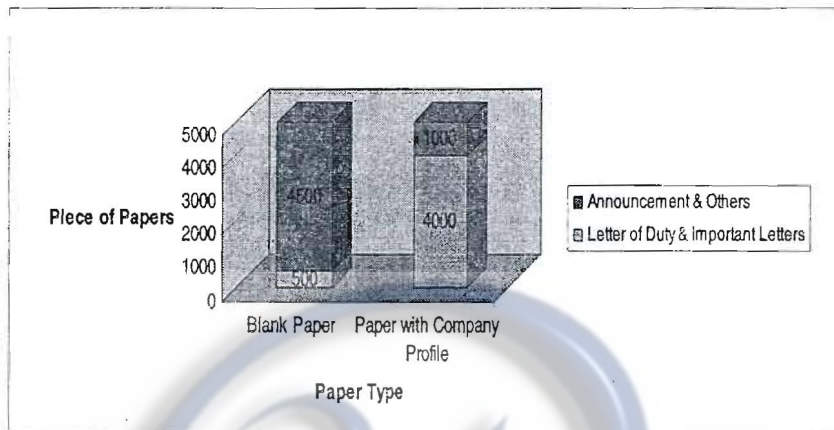


Figure 6: Paper used

## Solutions

Reducing the use of paper resources and improving the existing business process can be done in several ways. There are several solutions in this research.

### a. Business Process Improvement

Analyzing and designing improvement to business process

### b. Workflow concept and application

- (a) Share document and resources
- (b) Facilitating news
- (c) Facilitating forums and chats between lectures
- (d) Trying to increase trust on electronic documents

## 1. Workflow Application

Workflow application is specific application designed to support the implementation of workflow concepts. There are several applications to use to support it, but unfortunately it costs too much and the configuration of the software is complicated. To avoid the higher costs in developing administrative workflow, open source software will be a good choice on building a workflow application.

Figure 7 shows a design of workflow application. There are 2 main rooms, namely a Private Room and a Public Room. Every user gets a private room for storing private news and files. The Public Room is used for storing public news, forum and files. Every Public Room is related to some event in the dept. An Administrator is assigned to maintain user, application and database and will have full responsibility for system integrity.

This research focuses on workflow application to support the Administrator in the Informatics dept and support all computers that connect to LAN of the Informatics dept. In the future, the system could be integrated to the university web site, so it can be accessed from outside the campus. And if it happens, all works could be done any where without space and time limitations.

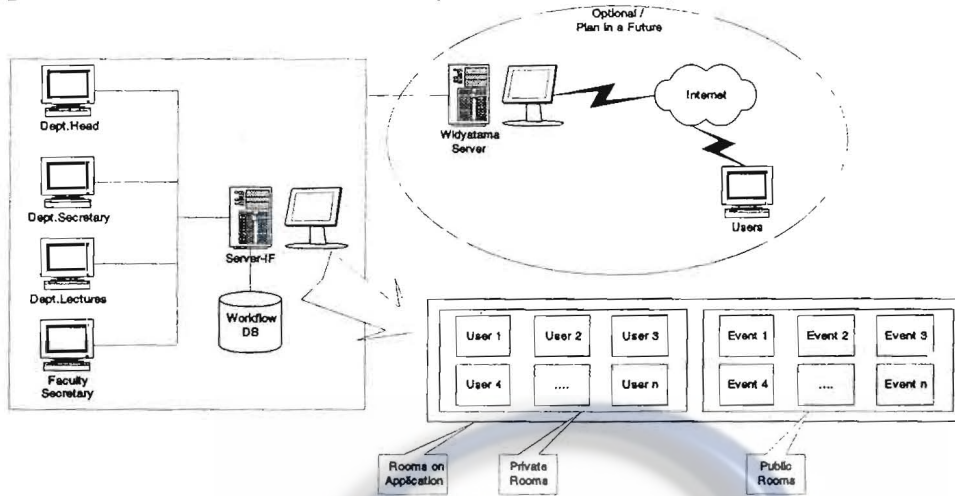
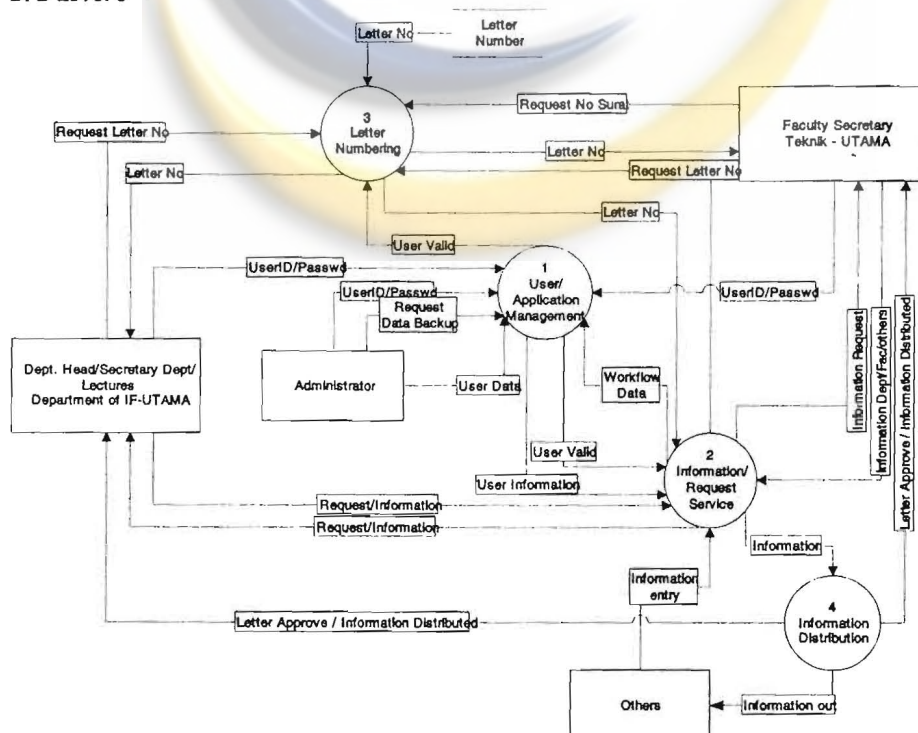


Figure 7: Workflow Application

## 2. Data Flow Diagram Design

Figure 8 shows how to simplify understanding on developing the workflow application. There are several improvements on data flow design, including letter numbering and information distribution to destination.

### DFD Level 0



### Figure 8: Data Flow Diagram – Level 0

As we see in Figure 8 above, there are 4 external entities involved namely:

a. Dept Head, Dept Secretary, Lecturers of Informatics Dept

Those are main users who have the same rights on the system.

b. Faculty Secretary

This entity has an important role on the system, especially on support information acceptance from outside dept and converts it to e-document formats.

c. Administrator

Administrators have a key role on user, application maintenance, and database backup. In addition, the Administrator has the roles of guarding system integrity.

d. Others

This entity belongs to a person or an organization from outside the Informatics dept. The information entries to the system in this case will only proceed by way of an application to and with the full support of the faculty secretary.

There are 4 main processes to support all operational systems namely:

a. User / Application Management

This process is used for maintaining users and applications. This process is the first gate to enter the whole system.

b. Information Request /Service

This process facilitates communication between external entity for request and information services.

c. Letter Numbering

This process serves the needs of letter numbering for incoming and outgoing letters or information. Letter numbering standard relates to dept letter numbering standard.

d. Information Distribution

Incoming information from external entity shall go through this process before it reaches a destination. This process will support reducing time on processing information.

### 3. Functional Flowchart Design

As we can see from the geographic flowchart analysis in the previous section, there are 3 floors involved in the current system. This condition will increase the time for processing or delivering letters or information. The new system will decrease the number of floors involved and the function of the ground floor will be eliminated because we don't need the photocopying process anymore. Communication among members of the Informatics dept will utilize workflow application, and use the e-documents. In addition to reducing the number of floors involved, the new system will decrease the distance and the use of building facilities, such as stairs and elevators. These will decrease the use of electricity.

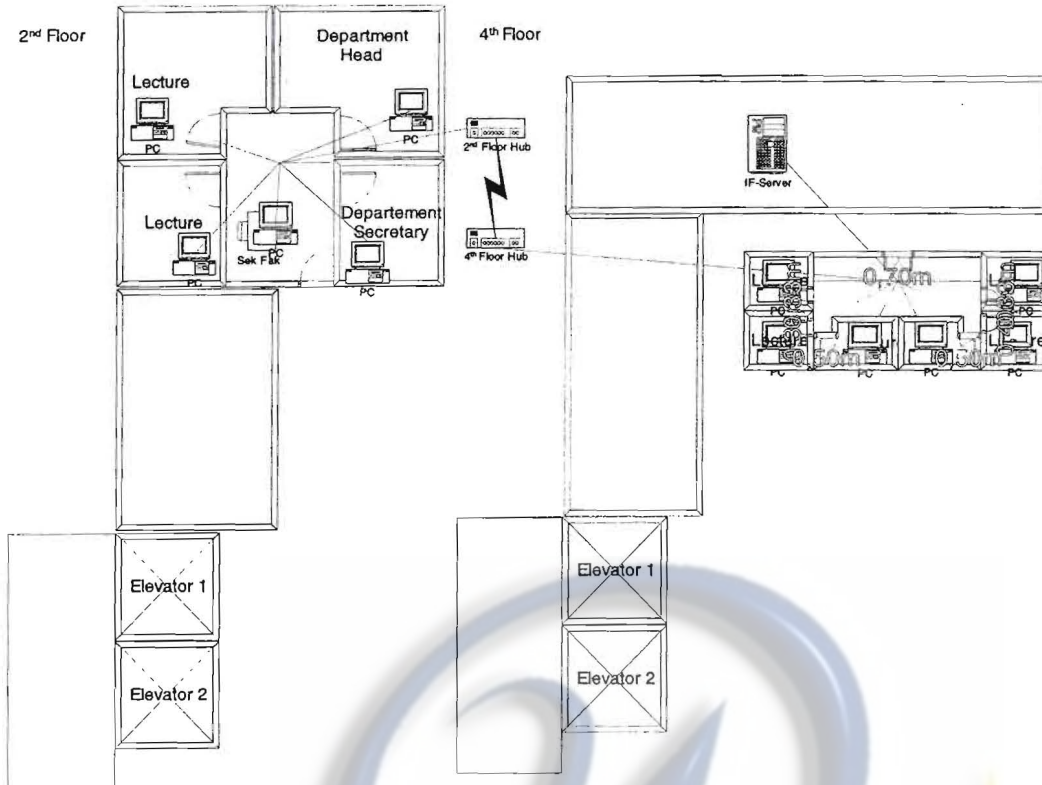


Figure 9: Geographic Flowchart Design for new system

#### 4. Functional Flowchart Design

The previous section shows the existing functional flowchart. For improving business process, I have created a new functional flowchart design. It will be shown in the next Figure below.

##### a. Request and Approval Letter (general)

The improvement on business process as shown on Figure 9 has strong connection to workflow application, which is:

##### (a) Standard Template and e-documents (green color)

Standard template is a standard letter form that is used by the Informatics dept. With this feature, making a letter will be completed in a shorter time. To reduce the use of paper, this system strongly recommends the use of e-documents (9-13, 16). All documents are stored on the Informatics Dept's server to reduce data duplication between connected computers and save cost for media storage.

##### (b) Letter Numbering and Message (blue color)

For letter indexing, the workflow application has a feature for letter numbering (8). This feature will simplify the searching of documents. Every information or new files on application will stay on the server, and announcement will be sent as a short message (17-21), without the information or new files themselves. This method avoids high traffic on LAN and avoids data duplication on connected computers.

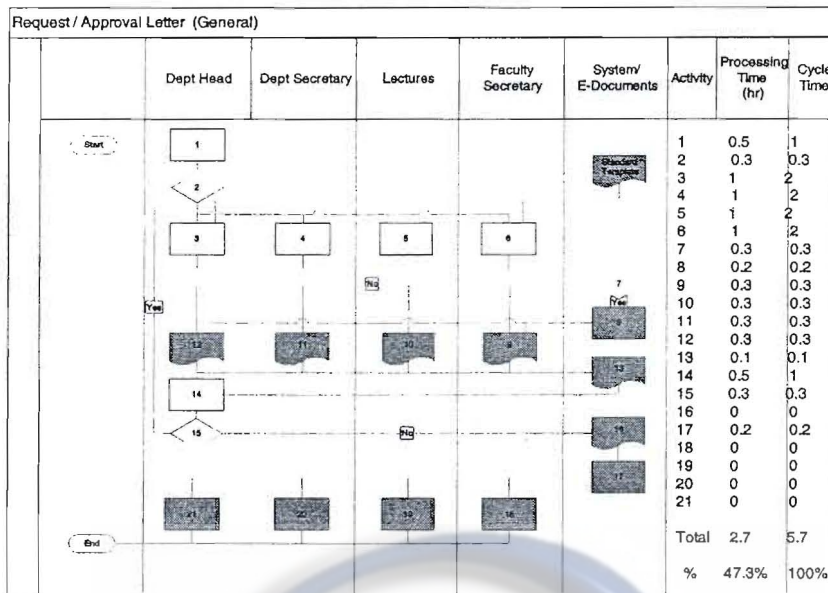


Figure 10: New Request / Approval Letter (general) Design

b. Delivery

Improvement on delivery business process (as shown in Figure 10) will help reduce time significantly. Incoming information from outside the system will go through this process, and incoming information from identified users will be processed automatically by application.

(a) Letter Numbering and Message (blue color)

To simplify the searching of a letter, application has a letter numbering (4) feature and after all letters are converted into e-documents, a new message will be generated by application to destination user (8-12).

(b) e-documents (green color)

In conclusion, the purpose of this research strongly recommends the using of e-documents, so it can be distributed by application.

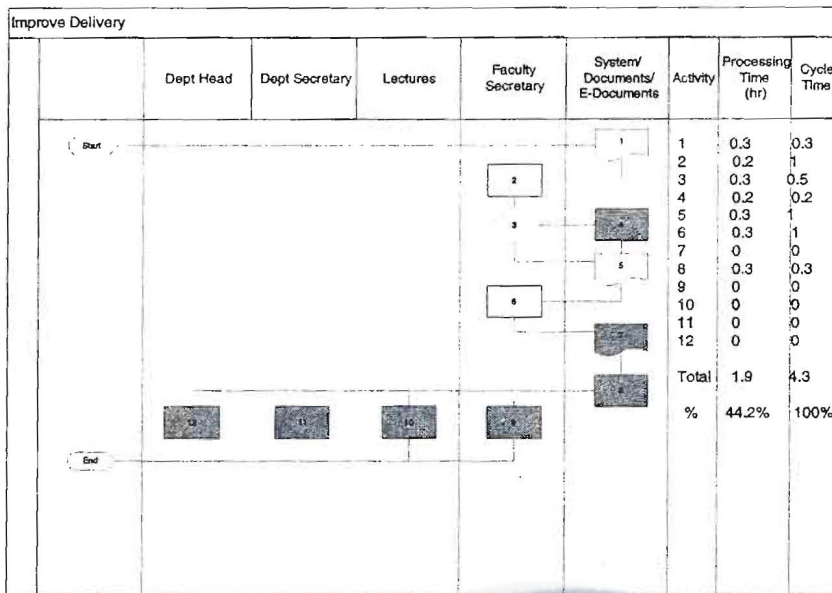


Figure 11: New Delivery Design

As can be seen from the functional flowchart design above, there are several new things compared to current system. These can make the new system work better than the current system. All processes involved in the functional flowchart design above are shown in Table 2 below.

Improve Request / Approval Letter (General)			Improve Delivery		
No	Activity	Responsible Area	No	Activity	Responsible Area
1	Need of Letter for activity on department	Dept Head	1	Documents Receive	System/Documents
2	Decision on person incharge	Dept Head	2	Documents Processing	Faculty Secretary
3	Make a letter for activity (support by Standart Template)	Dept Head	3	Decision to Documents Numbering	Faculty Secretary
4	Make a letter for activity (support by Standart Template)	Dept Secretary	4	Documents Numbering	System
5	Make a letter for activity (support by Standart Template)	Lectures	5	Letters with number	System
6	Make a letter for activity (support by Standart template)	Faculty Secretary	6	Documents conver to E-Documents	Faculty Secretary
7	Decision on Letter numbering	System	7	E-Documents store on IF-Server	E-Documents
8	Letter numbering support by Application	System	8	E-Documents distribute by application	System
9	Letter Print as E-Documents	E-Documents	9	Faculty Secretary receive message	System
10	Letter Print as E-Documents	E-Documents	10	Lectures receive message	System
11	Letter Print as E-Documents	E-Documents	11	Dept Secretary receive message	System
12	Letter Print as E-Documents	E-Documents	12	Dept Head receive message	System
13	E-Documents store on IF-Server	E-Documents			
14	Check a letter for approval	Dept Head			
15	Decision approval or need for revision on a letter	Dept Head			
16	E-Documents have approve by Dept Head	E-Documents			
17	E-Documents distribute by application	System			
18	Faculty secretary receive message	System			
19	Lecture receive message	System			
20	Dept secretary receive message	System			
21	Dept head receive message	System			

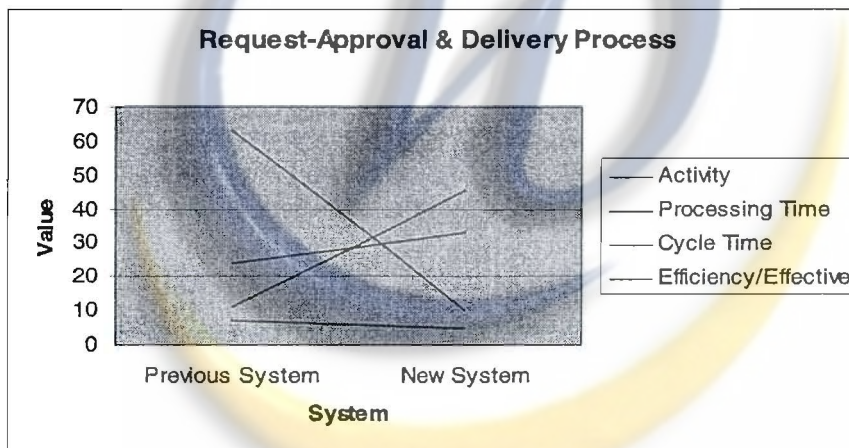
Table 2: Functional Flowchart Design Process

## Time Reduction

Although this workflow application is still under development, analysis of the existing systems and predicted improvement on the new systems convinced the researcher that the new systems could reduce the processing times of specific business processes. Values in Table 1 are taken from the functional flowchart analysis as shown in the previous section. Figure 11 shows the total activity of the previous and new systems.

	Previous System			New System		
	Request & Approval	Delivery	Total	Request & Approval	Delivery	Total
<b>Activity</b>	15	9	24	21	12	33
<b>Processing Time</b>	4,5	2,5	7	2,7	1,9	4,6
<b>Cycle Time</b>	33,3	29,8	63,1	5,7	4,3	10
<b>Efficiency/Effective</b>	13,5%	8,3%	10,90%	47,3%	44,2%	45,75%

Table 3: Time Reduce



## Security Issues on Implementation

To reduce the problems at the implementation stage, the system will include the following:

### a. System protection

The system will be used only by a user in the Informatics dept (with password), and every new user can only be added by the Administrator. This method will keep the integrity of the system and protect it from external attacks.

### b. Documents protection

The application will protect e-documents with data encryption and digital signature to keep the validation of e-documents.

## Advantages

There are several objectives of the new system that will hopefully be achieved by the Informatics department in the future, and these include:

- a. Reduced Costs by
  - Reducing the use of papers and printer toners
  - Increasing the used of computers
  - Reducing space on documents storage
  - Reducing duplication of files between computers in groups
  - Reducing budget on formal meetings
  - Reducing cost of photo copying
- b. Reduced Time wastes by
  - Increasing information flow
  - Allowing discussions to happen anytime
- c. Access to system resources without space and time limitations

## How Can We Do It?

### a. Commitment

As mentioned before, the biggest effort with implementation of good information system is commitment from every functional areas of the organization involved in using the system. Without it, the implementation of an information system will create new problems on organization.

### b. Culture Change

The hardest part in implementing a new system is changing the culture in an organization. But if every functional area in the organization is well aware of the implementation of a new system and sincerely believe that it will simplify and reduce time wastes, the system will work well.

### c. New Rules on limiting the use of resources, especially papers

Sometimes the implementation of a new system needs new rules to encourage functional areas in an organization to use the system. Employees should have positive thinking on the new rules and should believe that it will bring new hopes to solve problems in the organization.

## Conclusion

Eventhough this system is not implemented yet, I believe the analysis and the design process described in the previous sections show that there are several conclusions to be made. They include:

- a. The new system will improve the reliability of information
- b. The new system will improve response time
- c. The new system will decrease costs
- d. The new system will reduce inventories
- e. The new system will increase profits
- f. The new system will reduce bureaucracy

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