Analysis of Implementation and Proposal Development of ERP System in CV Indah Jaya

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Abstract. CV Indah Jaya is a company engaged in printing since 1960. Many requests and various products in the company that became a trigger for CV Indah Jaya to use an ERP system. The company want its process to be more efficient and effective. Starting 2013 CV Indah Jaya implements an ERP system with a MySQL database. An ERP system that is already running can be used to receive orders, calculate order calculations, calculate inventory and also payment and shipping. However, the company has not yet felt the benefits of implementing this system optimally. The purpose of this study is to implement an ERP system and provide development support so that business processes are more efficient and effective. The first step is to analyze the current system workflow and decomposition of the ERP system that is being used by the company. Then make a questionnaire and interview with stakeholders regarding the use of ERP systems referring to the PIECES Framework to find out the actual user needs for the ERP system. The results of the analysis are application users who do not have clear procedures for using an ERP system, the same data input must be done repeatedly, the flow menu is not clear, the user interface is not user friendly, and there are still many reports that the system cannot yet produce. To overcome this problem, several standard operating procedures (SOP) were made in accordance with the ERP system workflow and gave the ERP system blueprint for further development. The results of the questionnaire after the application of the SOP have increased for Information and Data of 0.45, Economy of 0.38, Control and Security of 0.38 and Services of 0.14.

1. Introduction
It is a challenge for every company to keep up with technology in order to remain competitive, namely to achieve goals so that products or services to customers can be more quickly delivered at lower costs than competitors. Technology that can help companies make careful planning on a regular basis to optimize all existing resources within the company is information system technology. Ellen Monk stated that integrated and efficient information systems can produce more efficient management of business processes [2]. When companies have efficient business processes, they can be more competitive in the market. An Enterprise Resource Planning (ERP) system can help a company integrate its operations by serving as a company-wide computing environment that includes a shared database. The ERP system is able to deliver consistent data across all business functions in real time [4].

CV Indah Jaya is a company at Magelang City, Central Java, Indonesia engaged in printing since 1960. Many requests and various products in the company that became a trigger for CV Indah Jaya to
use an ERP system. The company wants its process to be more efficient and effective. Starting 2013 CV Indah Jaya implements an ERP system with a MySQL database. The ERP system that is already running can be used to receive orders, calculate order calculations, calculate inventory and also payment and shipping. However, the company has not yet benefited from implementing this system optimally. Therefore, in this study, the use of ERP systems in the company has been analyzed, proposed the improvement or development of the ERP system, so that ERP system implementation produces a more efficient and effective business process.

2. Methodology
To realize an effective and efficient company business process, the first step that must be done in this research is analyzing the company's system workflow, then analyzing the ERP system application by understanding the program structure that is compiling the program decomposition. The second step is make a questionnaire to users and interview with stakeholders regarding the use of ERP systems referring to the PIECES Framework to find out the actual user needs for the ERP system. The third step is to propose improvements to each part that are lacking from the results of the questionnaire and interview, then apply improvements. And the final step is to evaluate the results of improvements using the same questionnaire before repairs.

3. Results
Based on the analysis results, it is known that business processes, program decomposition from the ERP system and the results of the questionnaire recapitulation and interviews are as follow:

3.1. Business Process
The following is an ERP system process flow that is in CV Indah Jaya which consists of five entities, namely customer, front office, storage, production and cashier. The business process starts when the customer submits an order bid, then the Front Office will input data on system to calculate the printing cost calculation. If the calculation results using an ERP system provided to customers are not approved, it will be recalculated by the Front Office. If the customer has agreed, then sales order will be authorized by the Front Office on the ERP system and will continue to work paper. Working paper making will make material expenditure in the ERP system that will be made by the storage section. The working paper will be provided in the production section. The working paper is a guideline in carrying out the production process. After completion of the production process, a note on the ERP system will be made by the cashier after the note will be given to the customer. The customer will make a payment to the cashier and will be inputted to the ERP system by the cashier. After inputting, the process is complete and the results of the report on the ERP system can be seen.

3.2. Program Decomposition
The following is the decomposition of the program from the current ERP system at CV Indah Jaya. The program consists of five main menus. The five main menus are File, Master, Transactions, Reports and Administration with decomposition in Table 1.

3.3. Questionnaires Results
The average results of the questionnaire user acceptance test software with PIECES framework [1, 5] that has been distributed to seven employees of CV Indah Jaya regarding the use of CV Indah Jaya’s ERP system in a scale of 1-5 are Performance 3.07, Information and Data 3.04, Economy 2.36, Control and Security 2.71, Efficiency 3.29, and Service 2.63.

3.4. Interview Results to Owner
Based on the questions submitted to the owner and administration of the company, the following results have been obtained:
The process of using CV Indah Jaya's ERP software has not been able to significantly increase sales form the company because the use of CV Indah Jaya's ERP software has not been smooth and there are still some obstacles such as incomplete menus and incomplete calculations.

| Table 1. Program Decomposition |
|-------------------------------|
| File       | Master       | Transactions   | Reports           | Administration       |
| Open       | Branch       | Price Calculation | Sales per Note    | Backup               |
| Close      | Warehouse    | Sales Order    | Sales Deleted     | User List            |
| Print      | Department   | Material Expenditure | SO Ready to Process | Environmental Var           |
| Print Properties | Class | SO Authorization | Tax Calculation | Change Password |
| Sort by    | Purchase     | Sales Deleted  | Purchases per Note |                        |
| Brand      | Entry        | Spending       | Summary of Material-expenditure |                 |
| Printer    | Journal      |                | Stock             |                        |
| Unit       | Debt         |                |                  |                        |
| Division   | Account      | Account Receivable | Entry |                        |
| Account    | Consumer     | Attendance     | Spending          |                        |
| Goods      | Pin Size     |                | Profit Loss       |                        |
| Spiral     | Plate        |                | Tax Resume        |                        |
| Price ID   | Payment of Receivables | Payment of fees per sales | | |
| Supplier   | Employee     | Payment of AR  | Payment of AR per | |
| Expenditures-List | Account Group | account |                  |                        |
| Account    |              |                |                  |                        |

The results of using CV Indah Jaya’s ERP software have not been as desired because there are still shortcomings in the output of the software, such as making sales order there is no reminder for shipping goods, the memorandum processing process has not been connected to the EDC machine, the results of the calculation cannot be with existing needs because there are calculations that are not suitable, the results of the paper also incomplete because there are no deadlines in each production process.

The report from CV Indah Jaya’s ERP software is still very lacking because there are not updated, for example, such as inventory reports that have never been updated so they still use manual calculations, besides the results of the entry report are never done automatically using software but still using manual calculation by adding up the existing notes.

The use of CV Indah Jaya's ERP software is not so resource-consuming because there is no need to add employees to enter data but existing employees who process the CV Indah Jaya ERP software, the computer used is also not too much and not too costly, paper also needed a little because it is only for making paperwork and notes.

From the observations of the application of CV Indah Jaya’s ERP software, it is quite difficult because many things, such as ERP software menus that are not user friendly, make it difficult for employees to use, but there is also no specific assignment of employees to do each task.

CV Indah Jaya employees have not used CV Indah Jaya’s ERP software properly, only a few menus are used and there are still many employees who are lazy to use the software and use the old system so that many of CV Indah Jaya’s ERP software systems have not been used.
4. Discussion
Proposed improvements based on the results of the analysed questionnaire are solutions for each question that has a value of less than 3 because with a value of less than 3 on a scale of 1 to 5 the results are classified as poor or still need improvement.

| Category            | Questionnaire                                           | Solution                                      |
|---------------------|---------------------------------------------------------|------------------------------------------------|
| Information & Data  | Complete output of the ERP system                       | Complete the output results                   |
|                     | Output format is good or neat                           | Tidy up the output format                     |
|                     | Complete data input                                     | Provides the required data input menu         |
|                     | There is no error in the data input process             | Redesigning the data input process           |
|                     | Ease of data input                                      | Designing an easier data input user interface |
|                     | There is no repeat of the same data input               | Designing queries from inputted data          |
|                     | Accuracy of stored data                                 | Create SOPs for users to always update data or input new data |
|                     | Ease of access to stored data                           | Designing the database structure             |
|                     | Easy menu access                                        | Design a user friendly program decomposition  |
| Economic            | The system simplifies business processes and increases company profits | Making SOPs for the use of ERP systems for all stakeholders [3] |
| Control & Security  | Data access security                                    | Improve system security                       |
| Services            | Reports produced according to needs                     | Make SOPs for reporting every month           |
|                     | Easy to understand system                               | Provide notes on the system                   |

The proposed settlement from the results of the interviews in sequence are as follows:
1. Complete the menu and calculations are needed for the sales process
2. Adding reminder, connection to EDC machines and deadlines on the results of the production process paper
3. Make SOP update data so that inventory reports can be generated by the ERP system
4. -
5. Restructuring the menu to make it more tidy and easy to navigate
6. Make an SOP for each menu so that it can be used by all users

Based on the results of analysis and discussion of the results of questionnaires and interviews, three SOPs have been designed in Table 3 until Table 5.

After applying the SOP for 2 weeks, the same distributed questionnaire user acceptance test software again. The results obtained did not change the Performance and Efficiency, there was a change in the average results in Information and Data by 0.45, Economics by 0.36, Control and Security by 0.38, and Service by 0.14.

In Performance, before the calculation process must enter complete data so that the sales order processing time and calculation process takes longer. In Information and Data, the more complete results for paperwork, sales orders in accordance with the needs and insignificant writing has been removed, the monthly report is neat and can be read easily, the calculation results are in accordance with manual calculations, working papers or reports can be printed done easily, data can be entered
easily and in accordance with the existing reality (real time or accurate), the user does not need to enter the same data repeatedly, stored data is easy to find, and menu access is easier. At Economic, even though it requires operational costs, but with the ERP system speeding up work and increasing orders that can be done so as to expand the market. In Control & Security, the system can be accessed by all employees with appropriate access rights arrangements. In Efficiency, although initially it was necessary to enter quite a lot of data, but the next process became more efficient. In Service, the use of the system has reduced the calculation process, reporting becomes increasingly fast and accurate, data is easy and fast to find, and the use of paper decreases, the system is easy to learn, the results of calculations are checked for consistency and accuracy so there is no need to recheck.

Table 3a. SOP Order Receipt

| Task            | Standard Operational Procedure |
|-----------------|--------------------------------|
| Order Receipt   | Steps to receive orders from customers and process these orders on an ERP system |
| Employee Front Office |
| Process         | 1. Record customer needs and criteria needed |
|                 | 2. Open the calculation menu |
|                 | 3. Enter the amount of paper needed according to the size of the order |
|                 | 4. Enter print size |
|                 | 5. Enter the number of colours |
|                 | 6. Enter the type of finishing needed |
|                 | 7. Include other additional costs |
|                 | 8. Start calculation |
|                 | 9. Save the calculation results |
|                 | 10. Print the calculation results |
|                 | 11. Give the customer the results of the calculation results |
|                 | 12. If approved, then proceed to the making of paperwork |

Table 3b. SOP The Making of Paperwork

| Task            | Standard Operational Procedure |
|-----------------|--------------------------------|
| Making of Paperwork | Steps for making work paper after the customer agrees with the price offered on an ERP system |
| Employee Front Office |
| Process         | 1. Enter the calculation results on the working paper |
|                 | 2. Save the results of paperwork |
|                 | 3. Print work paper for the production process |
|                 | 4. Print proofing results |
|                 | 5. Make approval for the production process |
Table 4. SOP Payment

| Task | Payment |
|------|---------|
| Description | Steps to save payment data from customer orders on an ERP system |
| Employee | Cashier |
| Process | 1. Receive orders from Front Office  
2. Open the Sales Order menu  
3. Make sales orders based on calculations that have been made  
4. Check the results of the sales order  
5. Open the Note menu  
6. Make notes based on sales orders  
7. Print note  
8. The customer makes a payment in accordance with the note  
9. Save note results  
10. Open the sales order menu  
11. Authorize sales orders  
12. Deliver sales orders to the production process to start production |

Table 5a. SOP Receipt Raw Material

| Task | Receipt Raw Material |
|------|----------------------|
| Description | Steps to receipt of raw materials on an ERP system |
| Employee | Warehouse |
| Process | 1. Item checking arrived  
2. Calculation of the number of items  
3. Open the item input menu  
4. Enter the type and number of employees received  
5. Update item prices in the event of price changes |

Table 5b. SOP Expenditure Item

| Task | Expenditure Raw Material |
|------|--------------------------|
| Description | Steps to expenditure of raw materials on an ERP system |
| Employee | Warehouse |
| Process | 1. Open the item release menu based on documents received from the front office  
2. Check the amount of goods needed for production  
3. Preparing goods  
4. Sending goods to the production floor |

For easier access to stored data, it is proposed to develop a database structure consisting of the following tables and attributes:

- Table Item: ItemID, ItemName, Quantity, Price
- Table PrintingMachine: PrintMachineID, TotalOfColor, MinimumPrintingPrice, OverPrintPrice, Size
- Table FinishingMachine: FmshMachineID, FmshMachineName, PricePerSheet
- Table Customer: CustomerID, CustomerName, Address, Phone

In order for the ERP system to be more user friendly, it is easier to manage user access rights, so the proposed program decomposition is proposed as in the table 6.
Table 6. User friendly program decomposition designing

| File     | Module                        | Administration |
|----------|-------------------------------|----------------|
| Open     | Warehouse                     | User Id        |
| Close    | Purchase                      | Password       |
| Print    | Material Expenditures         | Authority      |
| Print Properties | List of items |                      |
|          | Purchase reports              |                |
|          | Material expenditure reports  |                |
|          | Item stock report             |                |
| Calculation | Calculation                |                |
| Calculation Setup | Printing Machine |                |
|          | Print Prices                  |                |
|          | Finishing                     |                |
|          | Finishing Prices              |                |
|          | Calculation Result Reports    |                |
| Sales    | Sales Order                   |                |
|          | SO                            |                |
|          | SO Authorization              |                |
|          | SO Reports                    |                |
| Note     | Customer Data                 |                |
|          | Payment                      |                |
|          | Payment Reports               |                |
| Work Processes | Working paper        |                |
|          | Data reminder SO             |                |
|          | Schedule                     |                |

5. Conclusion
The efficient and effective implementation of the ERP system in CV Indah Jaya will be obtained if performance, information & data, efficiency, control & security and ERP system services are designed based on business processes and documents used. SOP is very necessary so that users can use the system properly so that the work becomes effective. Decomposition of the program affects the ease and efficiency of the system.

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