# Entreprise Resource Planning for the DAM Information System in Indonesia

## (*Entreprise Resource Planning untuk Sistem Informasi Bendungan di Indonesia*)

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**Abstract.** This research was conducted at the Ministry of Public Works and Public Housing, Director General of Water Resources, with a focus on research on the quality of data on dams in Indonesia. The problem that occurs is that there is still a delay in sending data by dam officers which causes the realtime data quality to decrease. This shows that there needs to be a comprehensive research on the facts that occur in the field. The purpose of this study is to explore the perception that Indonesia is capable of creating and operating an ERP system with a broad and large data coverage. This study uses the Value Stream Mapping method with Descrete Event Simulation (DES) to model a system that evolves over time. This research wants to know the future state design, namely developing an ERP (Enterprise Resource Planning) system based on IT (Information Technology) technology in improving the quality of integrated and realtime dam data. The results of this application are expected to experience an increase in time efficiency above 95% which shows the overall process time for sending dam data, namely (5 working days). Therefore, the authors examine what factors influence the success of ERP implementation. The purpose of this study is to obtain conclusions based on the success factors studied. By obtaining data based on this research, it is hoped that this thesis can be useful for practitioners in the ERP world, both software practitioners and implementation service practitioners.

Keywords: *value stream mapping, lean service, entreprise resource planning, descrete event simulation, realtime.*

**Abstrak.** Penelitian ini dilakukan di Kementerian Pekerjaan Umum dan Perumahan Rakyat, Dirjen Sumber Daya Air, dengan fokus terhadap penelitian kualitas data bendungan yang ada di Indonesia. Permasalahan yang terjadi adalah masih adanya keterlambatan pengiriman data oleh petugas bendungan yang menyebabkan kualitas data realtime menurun. Hal itu menunjukkan bahwa perlu adanya penelitian yang komprehensif terhadap fakta yang terjadi di lapangan. Adapun tujuan dari penelitian ini adalah menggali persepsi bahwa Indonesia mampu menciptakan dan mengoperasikan sistem ERP dengan cakupan data yang luas dan besar. Penelitian menggunakan metode *Value Stream Mapping* dengan simulasi *Descrete Event Simulation* (DES) untuk memodelkan suatu sistem yang berevolusi terhadap waktu. Penelitian ini ingin mengetahui rancangan masa depan (*future state*) yakni mengembangkan sistem ERP (*Entreprise Resource Planning*) yang bebasis teknologi IT (*Information Technology*) dalam peningkatan kualitas data bendungan yang terintegrasi dan realtime. Hasil dari penerapan ini harapannya mengalami peningkatan efisensi waktu diatas 95% yang menunjukkan secara keseluruhan waktu proses pengiriman data bendungan yakni (5 hari kerja). Oleh karena itu penulis meneliti faktor-faktor apa saja yang mempengaruhi keberhasilan implementasi ERP tersebut. Tujuan penelitian ini adalah untuk mendapatkan kesimpulan yang berdasar atas faktor-faktor keberhasilan yang diteliti. Dengan dapat diperolehnya data yang berdasarkan penelitian tersebut, diharapkan tesis ini dapat bermanfaat bagi praktisi di dunia ERP, baik praktisi perangkat lunaknya maupun praktisi jasa implementasinya..

Kata kunci: *value stream mapping, lean service, entreprise resource planning, descrete event simulation, realtime.*

## 1. Introduction

Dams are a very important water resource infrastructure that has functions and benefits to meet various needs for human life and livelihood. As stated in the Regulation of the Minister of Public Works and Public Housing Number 27/PRT/M/2015 concerning Dams, a dam is built and managed for the purpose of increasing the benefit of the function of water resources, preserving water and controlling the destructive force of water.

Dams provide enormous benefits in an effort to meet various needs and efforts to improve community welfare, including the provision of raw water for clean water, domestic and urban water needs, industry, agricultural irrigation water supply, hydroelectric energy generation and various other interests. In addition, a dam also has a function to support efforts to conserve water resources and the environment, to make use of water resources, the area and its environment, and to control the destructive force of water.

Apart from such great benefits, it should be realized that dams also carry a potential risk of disaster in the event of a dam failure or collapse. Therefore, in the construction and management of dams, guaranteeing the aspects of the sustainability of the functions and benefits as well as the safety aspects of the dam is very important. These aspects must be a major concern and consideration in any process of dam construction and management.

With the increasing number of dams that have been built with large amounts of funds, there has been a shift in the priority paradigm not only towards development but also optimization of management through efforts to increase operations and maintenance (OP).

Dam management, including the operation and maintenance of dams and reservoirs, as mandated in the Regulation of the Minister of Public Works and Public Housing Number 27/PRT/M/2015 concerning Dams, aims to ensure:

1. The sustainability of the functions and benefits of the dam and its reservoir through dam operation and reservoir operation.
2. Maintaining the prime condition of the dam through maintenance and maintenance of the dam.
3. Sustainability of dam safety through operation and maintenance, observation, monitoring, inspection, maintenance and rehabilitation activities.

It needs to be realized that many reservoirs in Indonesia have suffered damage and decreased function, performance and reliability due to internal and external factors. The decreasing effectiveness of the dam's performance is due to problems of silting the reservoir due to high sedimentation rates, decreased inflow discharge, and a decrease in the physical condition of the dam itself. Dam operation and maintenance activities must really be a priority concern in order to maintain and maintain the reliability of function, restore conditions in case of damage or degradation of function and maintain the safety of the dam and its environment.

## 2. Literature Review

**Entreprise Resource Planning**

Entreprise Resource Planning is a method for industry in pursuing more efficient business processes by sharing information within and between business processes and running business electronically (Lee et al., 2003). Entrepreneurial Resource Planning can also be defined as an information system that integrates and automates business processes related to aspects of the company's operations, production and distribution.

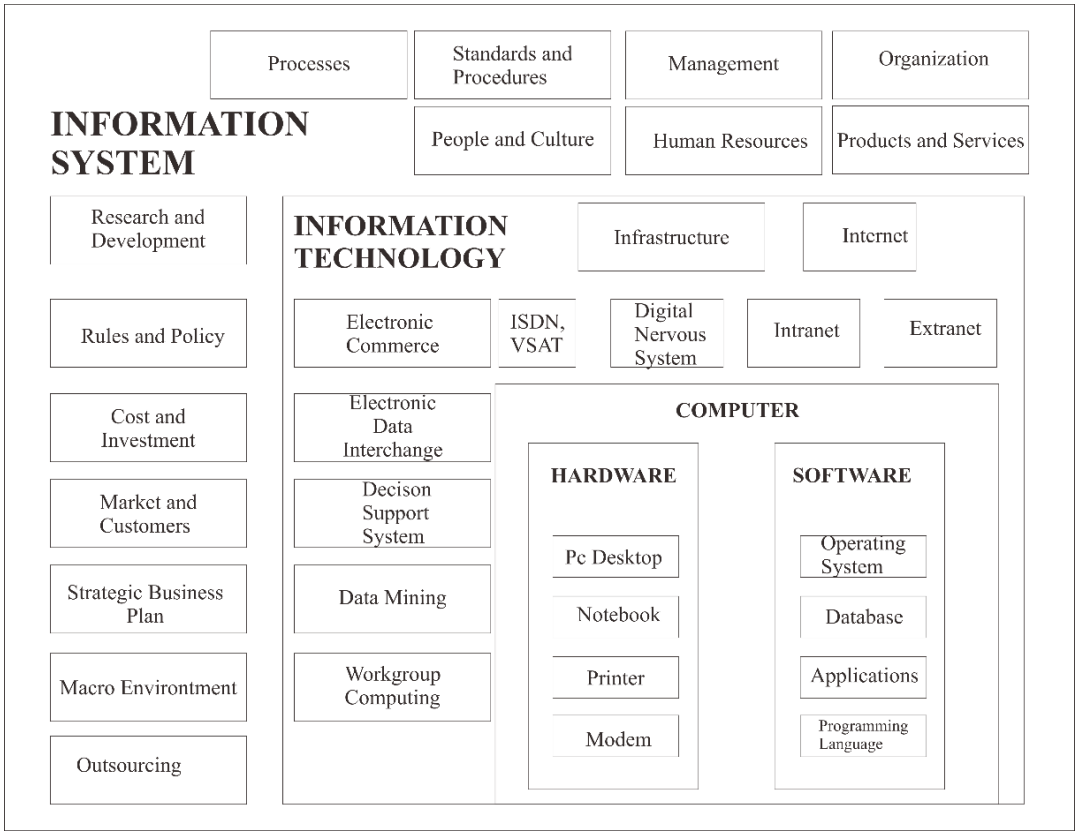


Figure 1 Information System.

## 3. Methods

Information system projects have good implementation methodological stages (Indrajit, 2001), namely:

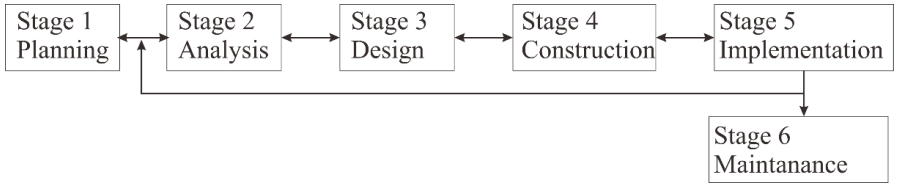


Figure 2 Information Systems Project Methodology.

1. Planning
   It is a series of activities starting from the emergence of the first idea of project implementation, initial definition of detailed project needs and targets, preparation of proposals, determining the methodology and project management system used to the appointment of a team and the formation of instructions for project execution.

2. Analysis
   Consists of analysis of business aspects carried out by studying the characteristics of the company concerned such as historical aspects, ownership structure, vision, mission, keys to business success (critical success factors), performance measurements, strategies, company programs to analyze system procedures. at the company.

3. Design
   Conducted by the information technology team and business or management team to design components of related systems where the information technology team carries out technical designs such as database systems, computer networks, interfacing methods, data conversion techniques, system migration methods, etc.

4. Construction
   It is a follow-up stage of the software design design stage that will integrate business functions and integrate stand-alone software. Conducted by a technical team that involves a lot of human resources (users).

5. Implementation
   Is the stage of using information systems in the company. The implementation strategy includes cut-offs and parallels. In addition to determining the implementation strategy, training is necessary for all parties involved to reduce the risk of failure.

6. Maintanance
   At this stage, good documentation and transfer of knowledge is needed from the system maker to the company's human resources.

**Research Framework**
Studying the conditions that occur in the study then conducting an analysis of the existing system, the analysis is supported by describing the conditions that occur using the Value Stream Mapping and Discrete Event Simulation to find out how much time it takes for 1 data rotation, the study was carried out validation tests with multiple regression analysis to use determine what things affect the success of ERP implementation so that it can be concluded that the improvement proposal can be continued or not.

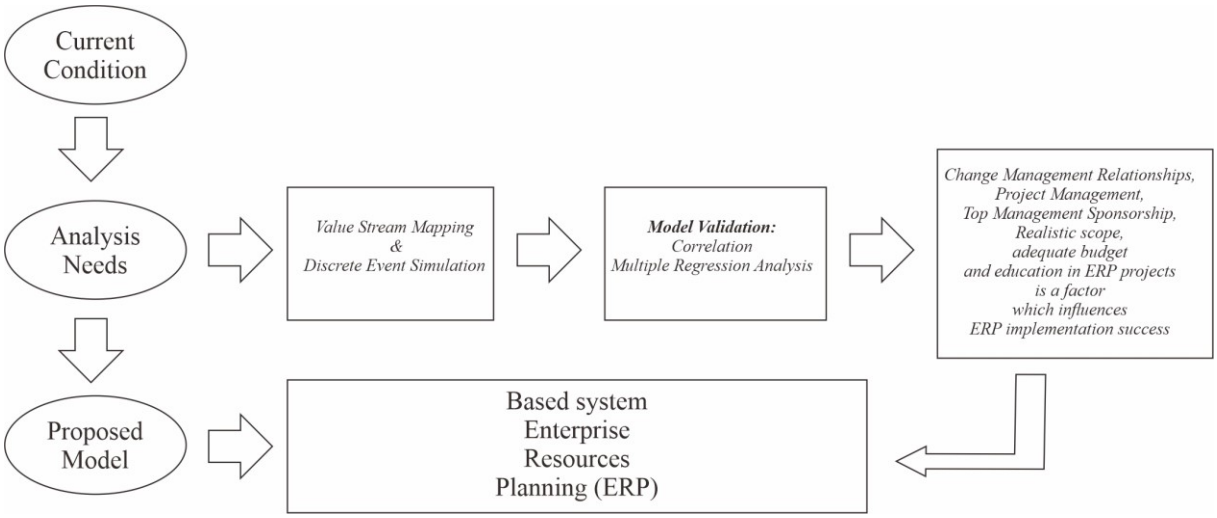

Figure 3 Research Framework.

## 4. Result and Discussion

This chapter will review the results of the questionnaire taken from the respondents. This chapter discusses the demographic profile of the respondents. Information related to ERP implementation within the ministry of public works and public housing, as well as dam officers, and discusses in detail the results of statistical tests carried out in analyzing what factors influence the success of ERP implementation. The number of respondents in this study were 200 people. The final section will explain about hypothesis testing with Multiple Linear Regression Analysis.

**Company Profile**
In carrying out operations and maintenance, every dam always tries to create a good, orderly and neat work procedure as a tool to achieve the duties and functions of the Dam Management Unit which has been determined and outlined by the Regulation of the Minister of Public Works and Public Housing Number 27/PRT/M/2015 about the Dam. The following is the Dam Management Unit Organization. The following is the structure of the Dam Management Unit (UPB).

**Conditions before ERP implementation**

Currently the ministry is still adopting the old thinking about the process of sending data which is still done manually, where each person in charge/the center performs manual grafting according to the work area and dams that are managed according to the work area. This raises many problems at the center because it receives data that still has to be managed and analyzed by the ministry.

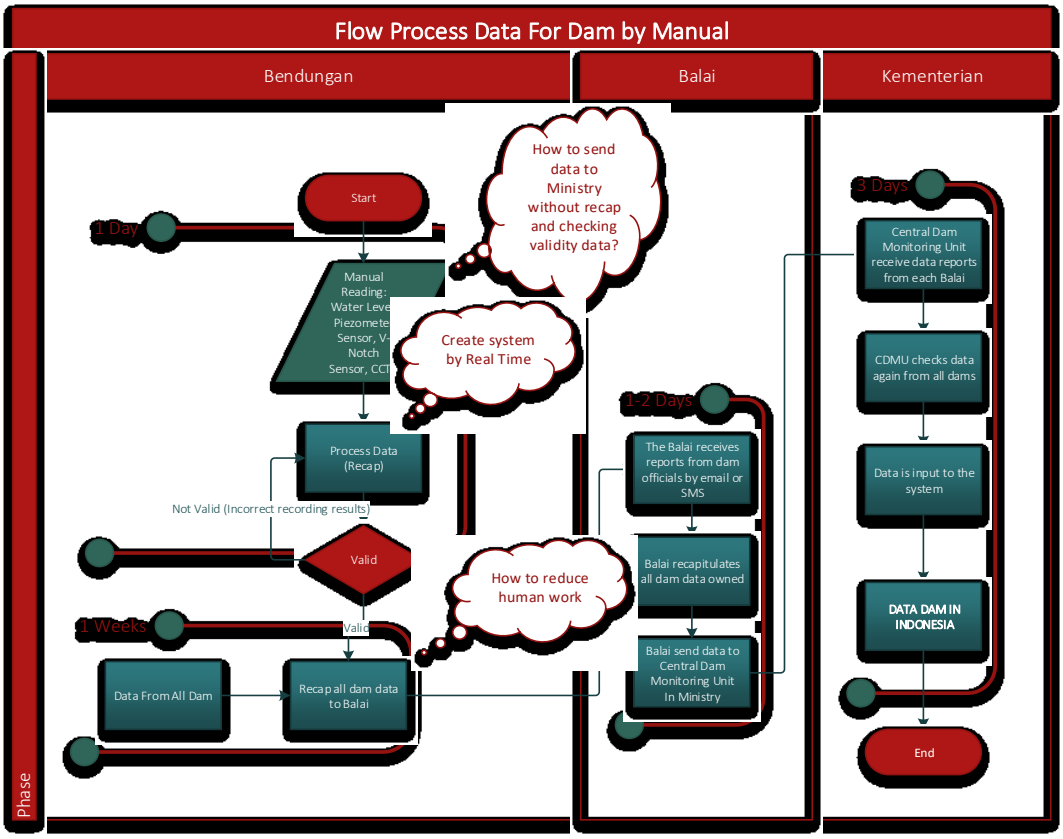


Figure 4 Flow Process Data for DAM by Manual.

Describes the flow of the data delivery process from the dam to the ministry where it is divided into 3 parts of the work:

1. Dam Works

   The process of reading the tools at the dam takes 1 day, until all data on the dam is sent to the hall. Balai needs to do check whether the data sent is valid or not by checking the photos sent by the dam officer when the equipment and real conditions are read in the field. If the results are valid, the data will be sent to the center for subsequent recap at the center to be combined with the results of the reports per center.

2. Hall

   The time required to complete data processing of all dams in the hall on average takes 2 working days, because the center needs to carry out the confirmation process with the party responsible for the hall. If the balai has completed this process it will send the data to the ministry as a weekly dam condition report.

3. Ministry

   After the data collection process at the center is sent to the ministry, the ministry will recap the data from all centers, this process takes 3 working days, because the ministry usually waits for the center to send data. So that often there was a bottle neck in data reporting because the hall was late in sending reports.

The problem of sending data is discussed in this study for how to minimize the process of sending data, by proposing an ERP-based data delivery process, where all elements will be integrated into an application to simplify the work of each stakeholder, and cut wasted time on data processing.

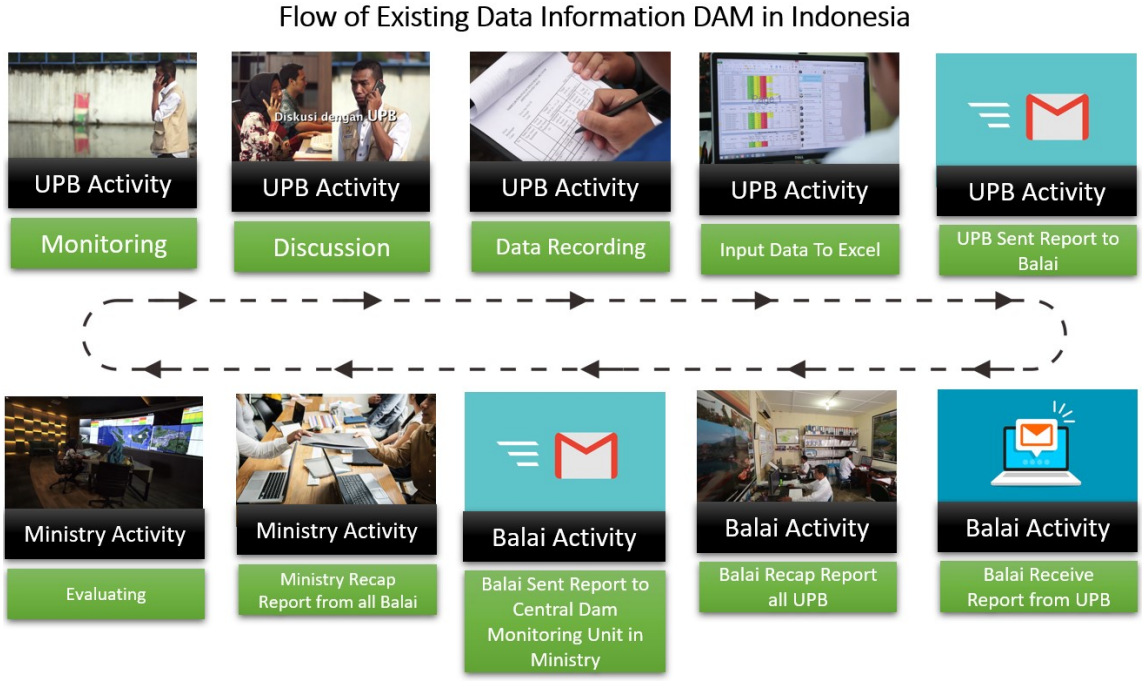


Figure 5 Flow of Existing Data Information DAM in Indonesia Manual.

**Conditions after implementing Enterprise Resource Planning**

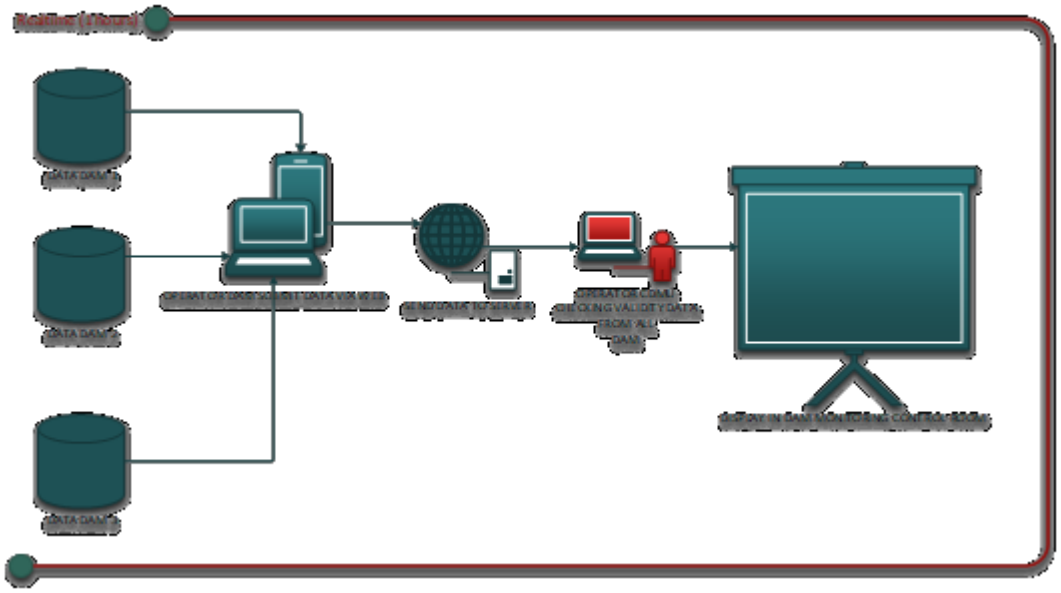

Figure 6 Conditions after implementing Enterprise Resource Planning.

The condition proposed in this study is to use a database that is integrated between stakeholders. Starting from downstream to upstream, where the dam as the lowest position has been conditioned, all data in the field can be sent using a device that can send data on a scheduled basis, at which time the data will be collected on the central server.

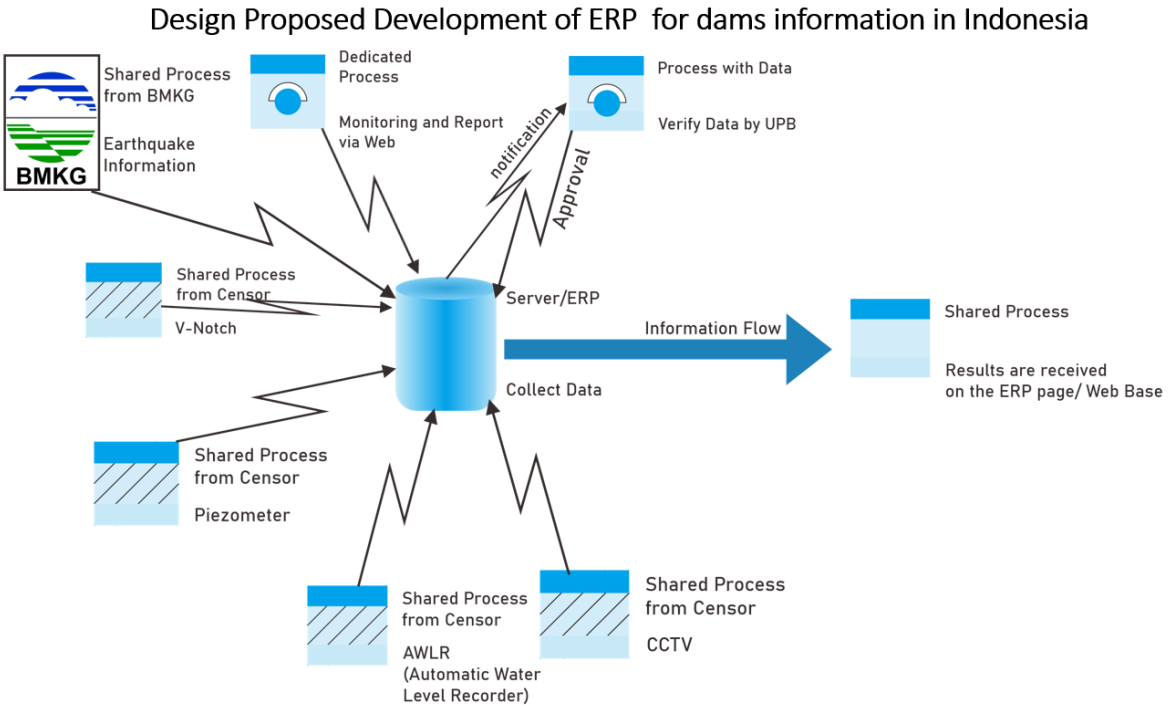


Figure 7 Design Proposed Development of ERP for dams Information in Indonesia.

Image proposed for the application of data-based Enterprise Resource Planning (ERP), where the dam officers only carry out the monitoring process to see the condition of the dam, do photo documentation of the dam water level, then the dam officer sends the data to the dam management unit, after the data is approved by the person in charge of the Dam Management Unit, the data will be confirmed by the center, if the input data and image data are suitable then the hall will send the data to the center to be broadcast at the ministry.

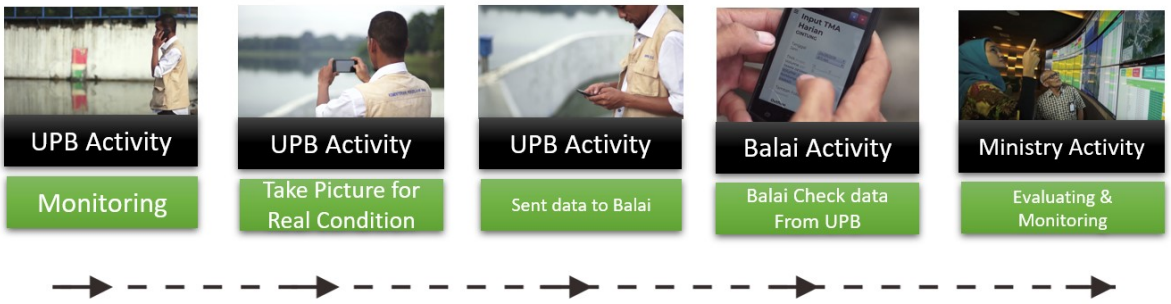


Figure 8 Activities after the implementation of ERP.

**Calculation of data transmission time**

To determine the time between before and after the implementation of ERP, it is necessary to calculate the time data which is done manually using a timer taken from 50 times the data collection of the dam data sending process so that a normal distribution is obtained.

Table 1 Step of dam data delivery stages (Sec)

| No. | Item Test | Step of Dam Data Delivery Stages (Sec) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Monitoring | Discussion | Data Recording | Input Data To Excel | UPB Sent Report to Balai | Balai Receive Report from UPB | Balai Recap Report all UPB | Balai Sent Report to Central Dam Monitoring Unit in Ministry | Ministry Recap Report from all Balai | Evaluating |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| 1 | Data Point | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| **2** | **Minimum** | **38** | **353** | **3866** | **10857** | **156** | **44029** | **65854** | **308** | **216401** | **21703** |
| 3 | Maximum | 1797 | 1770 | 10582 | 14230 | 296 | 85889 | 86344 | 600 | 258525 | 43190 |
| **4** | **Mean** | **41,21** | **1008,24** | **7132,24** | **12502,9** | **232,96** | **62516,7** | **75429,2** | **452,82** | **235646** | **32406,4** |
| 5 | Median | 1043 | 991 | 6961,5 | 12580,5 | 236 | 60675 | 74561,5 | 454 | 235876 | 32486,5 |
| **6** | **Mode** | **38** | **991** | **5812,5** | **10857** | **274** | **59420** | **74094** | **596** | **235322** | **32861,5** |
| 7 | Std. Deviation | 548,825 | 417,59 | 1915,16 | 1094,08 | 41,8764 | 11020,6 | 5485,1 | 94,4072 | 11867,2 | 6389,09 |
| **8** | **Variance** | **55,4481** | **41,4177** | **26,8521** | **8,7506** | **17,9758** | **17,6283** | **7,27185** | **20,8487** | **5,03603** | **19,7155** |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| DISTRIBUTION | | NORMAL | NORMAL | NORMAL | NORMAL | NORMAL | NORMAL | NORMAL | NORMAL | NORMAL | NORMAL |

**Comparison of the time between before and after ERP implementation**

The results of the calculation of conditions before and after ERP implementation, get a faster time, where the Warm-Up Time process in the existing system takes 30 minutes. This time is needed by the dam officer to walk and check each location of the tool reading in the field. Meanwhile, the suggestion in this research is to give faster time, which only takes 5 minutes, to do documentation and send to the dam management unit.

If it is simulated from the data collection process to send it to the center, the existing system will take 7097 minutes or about 5 working days. Meanwhile, the proposal to use ERP only takes 30 minutes, starting from data collection, data verification until data is sent to the center.

Table 2 Comparison of existing system time and proposed improvement

| *Simulation Model* | *Existing System* | *Proposed Improvement* |
|---|---|---|
| *Warm-up Time* | 30 min | 5 min |
| *Simulation Time* | 7097 min | 30 min |
| *Work Time* (Total) | 7127 min | 35 min |

**Comparison of Human Resources after ERP implementation**

After the comparison process has been carried out after implementing ERP, the proposed system can reduce the number of workers by 70%, because the process of activities carried out by humans is reduced, where the process is mostly helped by machine learning which can read data more accurately and accountably.

Table 3 Comparison of human resources after ERP implementation

| Simulation Model | Existing System | Proposed Improvement |
|---|---|---|
| Number of Operator | 10 | 3 |
| % Utilization (AVG) | 70% operator savings | |

**Reliability Analysis**

Before entering further using the data that has been collected, a reliability test is needed to test how reliable the data used in this study are. The reliability test used was to look at Cronbach's alpha value of each of the variables tested. The following are the results of the reliability test.

The significance test was carried out at a significance level of 0.05, meaning that the instrument could be performed reliably if the alpha value was greater than the critical r product moment. Where if it is less than 0.6 the reliability is less. While it is acceptable and above 0.8 is said to be good. In this case the writer determines the critical r value of the product moment of 0.7.

Table 5 Reliability analysis

| Variable | Cronbach's Alpha | N of Items | Standard Value | Conclusion |
|---|---|---|---|---|
| *Change Management* | 0.752 | 4 | 0.70 | **Reliable** |
| *Project Management* | 0.832 | 6 | 0.70 | **Reliable** |
| *Top Management Sponsorship* | 0.923 | 5 | 0.70 | **Reliable** |
| *Realistic scope* | 0.754 | 5 | 0.70 | **Reliable** |
| Adequate Budget | 0.794 | 5 | 0.70 | **Reliable** |
| Education in ERP Projects | 0.893 | 5 | 0.70 | **Reliable** |
| ERP Implementation Success | 0.816 | 4 | 0.70 | **Reliable** |

Based on Table 5 above, Cronbach's alpha value from the calculation results of the seven variables ranges from 0.752 - 0.923 or it can be said that the alpha value is > 0.70 (standard value). From these data, it can be seen that all Cronbach's Alpha values are very high, so it can be said that the instrument used is reliable. Then the instrument in the form of a questionnaire can be said to have a high level of reliability and consistency so that it is reliable for collecting research data. So that the instrument in the form of a questionnaire can be used in order to collect data.

Based on the two tests above, the questionnaire has been declared valid and reliable, so the questionnaire is fit to be distributed to the response and the resulting data can be used further in this study.

From the Cronbach's Alpha value that is greater than 0.7, the variables above are declared reliable and can be trusted to be used in this study.

**Validity Test and Factor Analysis**

The validity test is carried out by looking at two values, namely:

- The value of Corrected Item Total Correlation, where for the number of samples 200 and the 95% confidence level, the r table is (0.1388). In the tested variable the value must be greater to be declared valid. This test will be applied to the statements in each variable.
- Communalities value, where the value must be above 0.500 after previously having passed the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA) above 0.500 and the anti-image matrice also above 0.500 for each attribute.

Factor analysis is to analyze the indicator value in the validity test which is to reduce attributes that do not pass the criteria as described in Chapter II. The following are the results of the validity test for each variable and the statements in it.

**Analysis Regression**

Regression analysis was conducted to determine the independent variables, namely change management, project management, top management sponsorship, realistic scope, adequate budget, and education in ERP projects which significantly influence the dependent variable on the success of ERP implementation.

Table 6 F-test results in Anova[a]

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 2190.594 | 6 | 365.099 | 122.512 | .000[b] |
| | Residual | 575.161 | 193 | 2.980 | | |
| | Total | 2765.755 | 199 | | | |

a. Dependent Variable: SUC

b. Predictors: (Constant), SCO, CM, EDU, PM, BUD, TOP

Anova table shows the significance of the linear model used whether it is correct or not. Based on the table above, it can be seen that the F statistical value obtained is 122,512 with a significance value of 0,000. The significance value obtained is much smaller than the specified α value of 0.05 (5%). Thus it

can be concluded that the linear model used is correct. This shows that this model can be used to explain or explain the relationship and influence of change management, project management office, top management sponsorship, realistic scope, adequate budget, and education in ERP projects on ERP implementation success.

**Contribution of Independent Variables to the Model**

Table 7 Model *summary*[b]

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .890[a] | .792 | .786 | 1.726 |

a. Predictors: (Constant), SCO, CM, EDU, PM, BUD, TOP
b. Dependent Variable: SUC

It is known that the R number above is the correlation value or the value of the relationship between Change Management, Project Management, Top Management Sponsorship, Realistic Scope, Adequate Budget and Education in the successful ERP implementation project, namely 0.890. So that the relationship between Change Management, Project Management, Top Management Sponsorship, Realistic Scope, Adequate Budget and Education in Projects with the success of ERP implementation is 89%.

Meanwhile, R Square (correlation number or r squared) is 0.792. The number R Square is also known as the coefficient of determination. The amount of determination coefficient is 0.792 or equal to 79.2%. This figure means that all independent variables, namely Change Management, Project Management, Top Management Sponsorship, Realistic Scope, Adequate Budget and ERP Project Education, can explain the relationship with the dependent variable, namely the Success of ERP Implementation by 79.2%. While the remaining 21.8% is explained by other variables which are not discussed in this study.

**Significance of Independent Variables**

Because the linear regression model used was correct based on the ANOVA test, it was continued with the t test to obtain the regression coefficient and test its significance. The results of data processing for the t test using SPSS version 23 can be seen in the following table:

Table 8 Significance of independent variables

**Coefficients[a]**

| Model | | Unstandardized Coefficients B | Unstandardized Coefficients Std. Error | Standardized Coefficients Beta | t | Sig. |
|---|---|---|---|---|---|---|
| 1 | (Constant) | 11.307 | 1.131 | | 9.993 | .000 |
| | CM | .009 | .161 | .009 | .056 | .955 |
| | PM | .051 | .124 | .074 | .410 | .682 |
| | TOP | .373 | .154 | .739 | 2.425 | .016 |
| | BUD | .134 | .180 | .158 | .745 | .457 |
| | EDU | -.051 | .184 | -.080 | -.275 | .783 |
| | SCO | .010 | .063 | .010 | .160 | .873 |

a. Dependent Variable: SUC

The table above shows the results of the t test with the results of only 1 independent variable whose significance value is below 0.05, namely the Top Management Sponsorship variable. This means that there is an effect of 1 variable on the dependent variable. The value of B in the Change Management, Project Management, Top Management Sponsorship, Adequate Budget, and Realistic Scope variables shows a positive relationship pattern between this variable and its dependent variable.

Meanwhile, the other five independent variables, namely Change Management, Project Management, Top Management Sponsorship, Adequate Budget, Education in ERP projects and realistic Scope, do not have a significance value that passes the required value, namely <0.05. Therefore, these five independent variables are declared to have no influence on the dependent variable on ERP implementation success.

**Hypothesis Testing**

Table 9 Hypothesis testing

| Hipotesis | Test Result |
|---|---|
| H1 : *Change Management affects the success of ERP implementation* | Rejected |
| H2 : *Project Management affects the success of ERP implementation* | Rejected |
| H3 : Top management sponsorship influences the success of ERP implementation. | Accepted |
| H4 : Setting a realistic scope affects the success of ERP implementation | Rejected |
| H5 : *Adequate budget affects the success of ERP implementation* | Rejected |
| H6 : Education in ERP projects affects the success of ERP implementation | Rejected |

*Hypothesis Review 1*
Hypothesis 1 is rejected (not accepted) because there is an insignificant relationship between change management factors and ERP implementation success. It is stated by the significance value of this factor that exceeds 0.05, which is 0.955. Although in other similar studies there are conclusions stating that there is an influence between change management and the success of ERP implementation, however, in this research, respondents considered change management to have no effect. Researchers concluded that respondents in the interview considered change management to have no effect. Researchers also suspect that this is related to the understanding of some respondents in the interview who think change management is part of project management and not a separate job apart from project management.

*Hypothesis Review 2*
Hypothesis 2 is rejected (not accepted) because there is an insignificant relationship between project management factors and ERP implementation, which is stated by the significance value of this factor that exceeds 0.05, which is 0.682. Even though in similar studies where project management is influential, researchers also think that respondents did not really take part in building this application, so that respondents think project management has no effect.

*Hypothesis Review 3*
Hypothesis 3 is accepted because there is a significant relationship between Top Management Sponsorship and the success of ERP implementation, which is stated by the significance value of this factor which is less than 0.05, which is 0.016. This is consistent with the researcher's experience that the influence of Top Management Sponsorship has an effect on the success of ERP implementation. The reality in the field that the SINBAD application is fully supported by the leaders, starting from the lowest level to the minister, this application can run thanks to the support of the stakesholder and regional leaders to run this ERP application.

*Hypotheses Review 4*
Hypothesis 4 is rejected (not accepted) because there is an insignificant relationship between realistic scope and ERP implementation which is stated by a factor significance value exceeding 0.05, which is equal to 0.873. Although in previous studies there was a conclusion that there was an influence between realistic scope and ERP success, in this study respondents considered that the realistic scope factor had no effect on the success of ERP implementation.

*Hypothesis Review 5*
Hypothesis 5 is rejected (not accepted) because there is an insignificant relationship between adequate budget and ERP implementation which is stated with a factor significance value exceeding 0.05, which is equal to 0.457. Although the previous research stated that the budget is adequate with the success of ERP implementation. Respondents argue that the budget is not one that influences the success of ERP implementation. Researcher's experience is because there are many cheaper and quality ERP software that can simplify the ERP implementation process.

*Hypothesis Review 6*
Hypothesis 6 is rejected (not accepted) because there is an insignificant relationship between education in the ERP project and ERP implementation, which is stated by the significance value of this factor that exceeds 0.05, which is 0.783. Although similar research states that there is an influence between education and training on the success of ERP implementation, in this study, respondents considered this factor to have no effect.

**Industrial Implication**
The ERP implemented at the Ministry of Public Works and Public Housing is considered successful in implementing time in the data transfer process, which has been proven in the purposed model to provide time efficiency of up to 99%, meaning that ERP is considered successful in application and implementation in the field.

The proposal for developing an ERP-based system provides faster time efficiency than the previous process, ERP requires investment to develop applications at a later date, because the more the number of dams in Indonesia, the more data synchronization will return, and it does not rule out the ERP system that has been created. must be able to adapt to the times and the needs of the government.

Using ERP can easily determine policies when conditions are abnormal at a dam. For example, if an earthquake occurs, we can inform which dam is closest to the point of the earthquake, so that we can inform quickly so that no damage occurs due to the earthquake or can easily evacuate residents who live around the dam at the time of the disaster.

With the implementation of the ERP system, the process of sending data to the ministry is 95.50% faster than the previous system. With ERP the number of operators can be reduced, and an integrated ERP system can improve data quality, speed up the reporting process, and improve dam safety in Indonesia. With the implementation of the ERP system, the most important thing in this case is the discipline process in the data reporting process, with the verification of the ERP system it becomes more valid by attaching photos in the field.

## 5. Conclusion and Suggestion

**Conclusion**
The successful implementation of ERP implementation, it can be concluded that in response to this influencing factors:

1) Education in ERP projects
2) Change Management
3) Adequate budget

While the four other factors below are concluded not to affect the success of ERP implementation:

1) Top Management Sponsorship
2) Realistic scope
3) Project Management
4) Adequate budget

If the average data transmission time is 35 minutes, ERP will easily receive data in real time, and make it easier to evaluate data on a daily basis rather than conditions before the implementation of Entreprise Resource Planning.

**Suggestion**

The results of this study are still wide open for further research when carried out on different respondents. For example, the author tries to combine with various parties who have open data integration or parties involved in implementing ERP, those who fail to implement ERP can this research be used as material in the next implementation.

The implementation of ERP in dams in Indonesia must have features that are open to the wider community, for those who want to know more about dam systems and safety. So that information is easier to get by the wider community. In addition, this research is used as material for further research in deepening Enterprise Resource Planning.

On the other hand, this study only captures some of the factors that determine the success of ERP. There is still plenty of room for exploration such as:

- ERP implementation strategy, before being applied to a complex space and model or a smaller scope such as an office or business that requires simple ERP implementation.
- ERP is a flow model in data integration that requires activities that require many people to manage.

Researchers hope that this research will become new information or models in advanced ERP research such as features such as early warning via SMS, or ERP that is made in Android-based applications from existing data.

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