

ANALYSIS OF THE EFFECTIVENESS OF INTEGRATED INFORMATION SYSTEM IMPLEMENTATION (CASE STUDY: PT SAMUDERA MULIA ABADI TBK)

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ABSTRACT

Entering the era of information and free trade, PT. Samudera Mulia Abadi requires a certain advantage in order to face national and international competition. For this reason, every company strives to provide the best service facilities for customers through the accuracy, precision and effectiveness of information. These things must be supported by the development of information technology at this time. An organization that has a well-designed information system will generally have a competitive advantage over an organization with a weaker system. However, the facts show that the implementation of an information system is not easy. The more departments related to the information system, the more complex the information system will be and the higher the risk of failure. This research takes a case study of the effectiveness of information system implementation at PT Samudera Mulia Abadi (SMA) and what factors influence it. The method use in this study is a survey method by distributing questionnaires to all respondents who use an integrated information system at PT SMA. From the research results, it was found that several factors influence the effectiveness of information system implementation, including : user interaction with information systems, IT support, involvement of consultants and features of information systems. Without the above factors, it is very unlikely that companies that implement integrated information systems can take maximum advantage of integrated information systems that are applied to their companies

KEYWORDS *integrated information system, implementation*



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INTRODUCTION

Companies in various industries are competing to use integrated information systems to increase their competitiveness, for example by using an ERP (enterprise resource planning) system (Lotfi et al., 2013). ERP is an information system that

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integrates all information in an organization. User involvement is a very influential factor in the success or failure of the implementation of an information system. This research will provide an overview of what non-technical factors influence the effectiveness of information system implementation (Oladejo et al., 2020).

IT consulting firms can create an integrated information system that can monitor almost all company activities, control company finances, streamline company performance and increase company competitiveness. But in reality, information systems that have been well designed are difficult to implement in a company (Maiga, 2012). Often the results of the implementation of the information system are not in line with expectations or the time for implementing the system becomes much longer than the predetermined time (Creswell & Creswell, 2017).

The ineffective implementation of an integrated information system greatly disrupts the performance of the consulting firm (as the party in charge of implementing the system) and harms the company that uses the information system (as the user who has invested time and money). So this research needs to be done, why in the field often occur implementation of ineffective information systems ?

The effectiveness of an information system that will be examined here is seen from the user's point of view (Dobusch, 2014). The system is considered effective if the user is satisfied in using the system and its performance increases. With an increase in user performance, the company's performance will also increase and usually companies that use information systems will get the maximum benefit from the implementation of the information system (Putri, 2017).

Problem formulation.

Based on the description of the background of the problem above, the research problem is formulated as follows :

1. Does user interaction with the information system significantly influence the effectiveness of the information system implementation ?
2. Will IT support significantly influence the effectiveness of information system implementation ?
3. Will the support of consultants from outside the company affect the effectiveness of information system implementation ?
4. Will the information system supporting features affect the effectiveness of the information system implementation ?

Implementation of information systems

There are many examples of information system implementation failures in the existing literature. According to (Seddon et al., 1999) which tries to explain why failures often occur in information systems projects and how to guarantee project success.

Until now there has been no agreement on how to measure the success of an information systems project. The factors that lead to the success of an information system implementation project vary widely, depending on the stakeholders' point of view, different project characteristic and several other point of view

(Markus & Tanis, 2020) write that success depends on several things depending on who defines it. From the point of view of project managers and

information systems implementation consultants, they often define an implementation as successful if it has completed the project on time and on cost. But from the point of view of organizations using information systems, success is defined as the use of the system to achieve maximum results for their business, and usually they expect a smooth transition from the old system to the new system, get improvements from their business such as reducing inventories, or can improve accuracy in decision making.

Implement an information system to an organization, it will affect the existing processes within the organization. This is where the views of stakeholders and consultants making information systems usually meet each other. Complaints that are often issued are : *‘you built what I told you, but not what I actually wanted’*

Information system risks.

The hierarchy of risk analysis related to the creation of a software-based information system is : Information system risks can be classified into several categories. Where each risk has problems such as :

- Potential costs
- Time
- Technical / business consequences

To achieve success, a software-based information system must meet technical criteria and business requirements, within predetermined time and cost limits.

The risk of determining software projects: defining operational, organizational, and contractual software (DeLone & McLean, 2016). The project risk is primarily the responsibility of management. The risks of the project involve the determination of contract boundaries, external interfaces, relationships with suppliers, relationship with vendors, support from the organization.

Process risk : include here is management and technical work procedures. Management procedures, for example, are planning, staffing, tracking, quality assurance. While technical procedure risks are mainly found in design, program and testing activities.

Product risk : Failure of an information system product is entirely the technical responsibility of the vendor. Failures are often found in the required standardization stability, design, product usability, software complexity, and testing of the software. The more flexible a system is, the more difficult product risk will be to manage.

The complexity of information systems.

Table 1 Information system complexity

Making information systems, possible adverse effects	Low (0.0<P<0.4)	Medium (0.4<P<0.7)	High (0.7<P<1.0)
Number of departments associated information systems	1	2	5
The total time to create a system	5 man years	10 man years	20 man years

Estimated project implementation time required	< 12 months	13 months -- 24 months	>24 months
Estimated of changes to organizational functions that must be made, if the new system is implemented	0 – 25 %	25 – 50 %	50 – 100 %
The level of complexity of changes that must be made if a new system is implemented	Low	Medium	high

Source : (Pressman, 2016)

Table 1 shows the level of complexity of an information system based on the number of departments in an organization that are interrelated (Pressman, 2016). The more departments that are interrelated with information systems, the higher the level of risk/possibility of adverse effects. The table explains that the Company is the opportunity for possible adverse effects to occur.

RESEARCH METHOD

This research was conducted at PT Samudra Mulia Abadi Tbk. On jalan Pumorrow no 88, when new to the city of Manado. This research began in March 2022 until it was completed. The research was divided into several stages, starting with creating questionnaires, testing, questionnaires collecting data, analyzing data and preparing reports on the results of the research.

Because research is intended to determine the effectiveness of the implementation of information systems, especially at the level of information system users at PT Samudera Mulia Abadi. Then the population of the study is all people who directly use information systems to support their work. The data collection system using Simple random samples will be carried out using a questionnaire in several areas in Manado. Sample size will be determined based on time, cost and access considerations. This determination is important for statistical analysis of data

After the data can be collected, the data will be analyzed using the SPSS (Statistical Product and Service Solutions) program to determine the validity and reliability of the questionnaire.

The validity test aims to determine the extent to which an instrument can measure what it is intended to measure, so that it relates to the accuracy of the data. There are several approaches to testing validity (Newman, 2013): face validity, content validity, criterion validity and construct validity. The validity test that was carried out was limited to testing the validity of the respondents and the way the respondents filled out the instrument.

Reliability test is used to determine the consistency of the data. (Newman, 2013) defines there are 3 types of reliability : Reliable through time, Reliable through sub-population and consistent results through several different indicators.

Statistical measurements according to Cronbach's alpha, will be processed using the SPSS program to determine the reliability of the data collected.

$$\alpha = \left(\frac{N}{N - 1} \right) \left(\frac{S^2 - \sum S_i^2}{S^2} \right)$$

Where :

- □ reliability coefficient
- N : sum of items on questionnaire
- S² : variance of total questionnaire
- S_i² : variance of individual item

Source : (Newman, 2013)

Will check the validity and reliability of the data. Respondents who do not meet the filling criteria and do not meet the filling requirements will be discarded. Data that has passed the validity and reliability test will be collected in one table to make it easier to analyze the data. Measurements made in descriptive data analysis are : mean, frequency and dispersion using the standard deviation.

The mean is the average value of the observations. It is the sum of all the data divided by the number of data in the group (Aczel & Sounderpandian, 2019), the frequency shows the amount of data in the same category. This can be collected from the questionnaire obtained. While the standard deviation is a measurement of the spread of data

RESULT AND DISCUSSION

PT. Samudra Mulia Abadi

PT Samudra Mulia Abadi is a limited liability company engaged in the mining contractor sector, which was established based on notarial deed number 47 date 19 May 2010. PT. Samudra mulia Abadi started its business activities in the heavy equipment rental business. Beginning with the procurement of heavy equipment for exploration activities at PT. Arafura Surya Alam (J Resources-Doup Site-Kotabunan). Heavy Equipment Support at PT. Sago Prima Pratama (PT. SPP-Site Seruyung) and mining service activities at PT. J Resources Bolaang Mongondow Lanut site & Bakan site- North Sulawesi. PT SMA is one of the main contractors at PT. SPP (Seruyung site) which fully supports land clearing, exploration construction, mining and gold mining activities. In early 2012. PT SMA joined PT. J Resources Bolaang Mongondow Lanut site and supports mining activities. With the support of PT SMA, production can be achieved beyond the target. In early 2016, PT SMA started a new mining project with Rajawali Group subsidiary : PT. MSM / PT. The TTN – Toka Tindung Gold Mine Project is located in Likupang – North Sulawesi

Respondents

The information system used connects several departments of the company including the marketing department, purchasing department, inventory control

department, accounting/ finance department, HDR/payrolls department, construction department,

Because it connects many departments, the implementation of the information system will be very complex (Pressman, 2016), has a high risk, involves many users and takes a long time to complete.

Data were obtained by distributing questionnaires to the entire population of company employees who were directly involved in the implementation of the information system. Of the 74 respondents who were involved in the implementation of the information system, there were 62 respondents who filled out the questionnaire completely and met the requirements for further data processing.

Reliability and validity test

The reliability test is used to determine the consistency of the research instrument. So if the instrument is used to measure the same object, a consistent output will be produced. While the validity test is used to measure whether all construct indicators for a variable are consistent.

According to (Santoso, 2017), how to measure validity and reliability is as follows:
Validity test :

- If the coefficient r is positive and greater than r table ($r > r$ table) then the variable is valid
- If the coefficient r is negative or smaller than r table ($r < r$ table), then the variable is invalid

Reliability test :

- If r alpha is positive and greater than r table (r alpha $>$ r table), then the variable is reliable
- If alpha is negative or smaller than r table (r alpha $>$ r table), then the variable is not reliable.

From the test, it was found that for a significant level of 5 % ($\alpha = 0.05$) and $n = 50$, then r table = 0.279. whereas for $n = 100$, then r table = 0.195. for $n = 62$, then r table can be calculated through interpolation :

$$\begin{aligned}(62-50) : (100-50) &= (r-0.279) : (0.195-0.279) \\ 12 : 50 &= (r - 0.279) : (- 0.084) \\ r &= 0.258\end{aligned}$$

It can be seen the reliability and validity test for each variable :

- User interaction with information systems.
All r corrected items – Total correlation $>$ r table (0.258), meaning all items are valid r alpha (0.8457) is also greater than r table (0.258), meaning that all items are reliable.
- IT support.
Not all r corrected items – Total Correlation $>$ r table (0.258), means that not all items are valid, all r corrected items – Total Correlation $>$ r table (0.258) means all items are valid. r Alpha (0.8719) is also greater than r table (0.258), meaning that all items are reliable
- Involvement of external consultants.

All r corrected items – Total Correlation > r table (0.258), meaning all items are valid r Alpha (0.9099) is also greater than r table (0.258), meaning that all items are reliable.

- Features of the information system.
All r corrected items – Total Correlation > r table (0.258), meaning all items are valid. r = Alpha (0.9462) is also greater than r table (0.258), meaning that all items are reliable.
- Effective implementation of information systems.
All r corrected items – Total Correlation > r table (0.258) meaning all item are valid r Alpha (0.9324) is also greater than r table (0.258), meaning that all items are reliable.

Table 2 Summary of Reliability Test

Variables	n	Alpha
User interaction with information systems	62	0.8457
IT Support	62	0.8719
External Consultant engagement	62	0.9099
Features of the information system	62	0.9462
Effectiveness of information system implementation	62	0.9324

Correlation and Regression

The purpose of this correlation is to find out how big the relationship between variables is. For the correlation test, it was carried out using Pearson’s correlations on the SPSS software

Table 3 Correlation levels Based on Coefficients (Sugiyono, 2021)

Coefficients	Correlation levels
0.00 - 0.199	Very weak
0.20 - 0.399	Weak
0.40 - 0.599	Currently
0.60 - 0.799	Strong
0.80 - 1.000	Very strong

Regression can be done if there is a correlation between the two variables. In other words, if there is no correlation between the two variables, then the regression does not need to be done (Sugiyono, 2021).

a. Correlation

It can be seen the correlation between the dependent variable and the independent variables, after calculating using SPSS. Based on the correlation test, the following conclusions can be drawn :

- The correlation between the effectiveness of information system implementation and user interaction with information systems is moderate (0.591) and significant (0.000)
- The correlation between the effectiveness of information system implementation and IT support is strong (0.606) and significant (0.000)
- The correlation between the effectiveness of information system implementation and the involvement of external consultants is strong (0.632) and significant (0.000)

- The correlation between the effectiveness of information system implementation and the features of the information system is strong (0.772) and significant (0.000)

Table 4 level of correlation to the effectiveness of information system implementation

Variable	Pearson Correlation	Sig (2-tailed)	Correlation
User interaction with information systems	0.591	0.000	There is
IT support	0.606	0.000	There is
External consultant engagement	0.632	0.000	There is
Features of the information system	0.772	0.000	There is

b. Regression

The conclusions above show that there are 4 variables that correlate with the effectiveness of information system implementation. Then there are 4 independent variables included in the regression, with the dependent variable being the effectiveness of the information system. After being recalculated with SPSS, the regression is obtained as follows :

$$Y = -1.225 + 0.348 (X1) + 0.381 (X2) + 0.338 (X3) + 0.430(X4)$$

Where variable ;

Y = effectiveness of information systems

X1 = user interaction with the information system

X2 = IT Support

X3 = Involvement of external consultants

X4 = Feature of the information system

The significance level of the regression table above from the ANOVA table is 0.000, so the linear regression can be used to predict Y (information system effectiveness). With adjusted R square 0.805, which means that the four variables (X1, X2, X3, X4) contribute 80.5 % to the effectiveness of the information system. The remaining 19,5 % are influenced or caused by other factors.

Discussion

From the research.results.it can be seen that the variables that correlate with the effectiveness of information system implementation

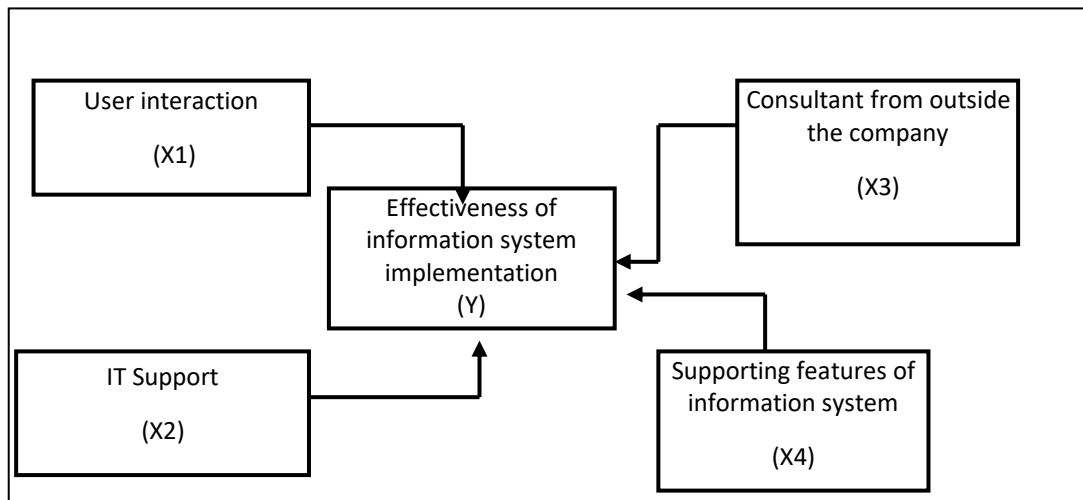


Figure 1 correlation between independent variable and dependent variable

The correlation between the dependent variable the effectiveness of information system implementation (Y) and the features of the information system (X4) is 0.772, followed by the involvement of external consultants (X3) is 0.632, IT support (X2) is 0.606, User interaction with information systems (X1) is 0.59.

How to explain the dependent variable the effectiveness of information system implementation (Y) based on the independent variables (X1, X2, X3, X4) ? This form of relationship is called regression. According to (Sugiyono,2000), a new regression test can be done if there is a correlation between two variables. In other words, if there is no correlation between the two variables, then regression is not necessary.

After carrying out a regression test on the independent variables of user interaction (X1), IT support (X2), involvement of consultants from outside the company (X3), supporting features of the information system (X4), it can be seen that the regression obtained from the research is :

$$Y = -1.225 + 0.348 (X1) + 0.381 (X2) + 0.338 (X3) + 0.430(X4)$$

From the regression equation shows that if other variables are considered constant then an increase of 100 % of the user interaction variable (X1), will increase the effectiveness of information system implementation (Y) by 34.8 %.

If other variables are considered constant, an increase of 100 % of the IT support variable (X2) will increase the effectiveness of information system implementation (Y) by 38.1 %

If other variables are considered constant, an increase of 100 % from the involvement of consultants from outside the company (X3), wil increase the effectiveness of the implementation of information systems (Y) by 33.8 %

If other variables are considered constant, then an increase of 100 % of the information system supporting feature variable (X4) will increase the effectiveness of information system implementation (Y) by 43.0 %

if all the independent variables are 100 % then the effectiveness of information system implementation. (Y) = $-1.225 + 0.348 (100\%) + 0.381 (100\%) + 0.338 (100\%) + 0.430 (100\%) = 0.272$. So according to the regression, there will

be an increase of 27.2 % of the Y variable. This also explains the facts, why failures often occur in many companies trying to implement integrated information systems, even though these companies have spent large amounts of money.

With a large amount of finance, usually company management that will implement an integrated information system will usually only choose (buy) features from sophisticated information systems (X4), expert consultants (X3) who are usually very expensive. In addition, the information system implementing company will also improve the existing IT support (X2) by sending the IT division to the information system training location that will be implemented in the company.

However, there are other factors that also influence the effectiveness of information system implementation (Y), which are often overlooked. This factor is user interaction (X1). Users /direct users of the information system will usually be passive and reject the new system. If there is no user interaction, then the effectiveness of information system implementation (Y) is as follows :

$$(Y) = -1.225 + 0.348 (0\%) + 0.381 (100\%) + 0.338 (100\%) + 0.430 (100\%) \\ = - 0.076$$

This means that the effectiveness of information system implementation (Y) is reduced by 7.6 % The reduced effectiveness of the implementation of the information system causes a decrease in user performance within the company and a decrease in user satisfaction in using the information system. Because according to SPSS calculation, the corelation between user performance and user satisfaction is strong (0.608) and significant (0.000)

CONCLUSION

Based on the research results, the following conclusions are obtained Critical success factors that affect the effectiveness of information system implementation are the Features of the information system, Consultant involvement, IT support and User interaction

The factors mentioned above influence (80,5%) on the success or failure of the effectiveness of the implementation of information systems.

The system of giving punishments or giving gifts to users of information systems does not significantly influence the effectiveness of information system implementation. Because as long as the user does no interact with the system being built, it is certain that the information system will not provide maximum results for the company.

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