Analysis of the Influence of Selecting Project Implementation Methods on Project Success: Case Study of Competency Certificate Reminder Feature Development at PT Eleska Iatki

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Abstract

Project success relies on effective management and efficient implementation methods. These methods optimize potential, overcome risks, develop timely plans, maintain quality, and manage budgets. A correlation analysis was conducted on four attributes: clarity, accuracy, effectiveness, selection of methods, and standard methods. The results showed a high correlation between project implementation methods and project success, indicating a significant impact on project success. PT Eleska Iatki, a business process provider, requires digital projects for competency certificate validity period reminders, emphasizing the importance of appropriate implementation methods for project success and company goals.

Keywords; Project Management, Implementation Methods, Correlation, Chi-Square, Data Analysis.

1. INTRODUCTION

A project is a non-routine business activity with money, time, and resource constraints as well as requirements for the final result [1]. A corporation or organization with a defined vision and goal cannot be divorced from its business activities, which may take the shape of a project. One of a project's components is regulated project management. A project's success depends on a collection of abilities, resources, and procedures known as project management [2]. In order to increase the likelihood of success, the finest business concepts apply tried-and-true strategies and tactics to address specific company problems [3]. One of the many aspects of project management that needs to be taken into account is the implementation strategy.

Project success is crucial in many fields, including construction, manufacturing, and software development. One of the important factors that determine project success is the selection of the right project execution method. Project execution method refers to a systematic and structured way of working to complete a project. Choosing the right method can help achieve project goals on time, within budget, and with the desired quality.

Implementation methods affect the success of the project, for example in construction projects or in system development. In addition to the role of the project manager is very important in rational solutions for project stages, the proposed method for rational planning in pre-project preparation and design is also a factor in the success of a project. A method can be proposed for selecting the most rational solution when planning the stages of pre-project preparation and design development for the facility to be built, taking into account the impact of factors on the duration of the development stages [4]. The selection of a suitable project method is used in the development of the educational field. The project method in this case is a way to find a solution to the problem at hand [5].
Several researchers agree that five stages in project management are closely related to project implementation methods, namely Initiation, Planning, Execution, Monitoring and controlling, and Closer (Completion) [6]. The project implementation method is used to optimize the potential possessed by users and stakeholders to overcome the risks that will be faced, prepare plans that are timely and effective, maintain quality and integration, and manage the agreed and determined budget.

Various elements are classified as project implementation technique factors in the Project Management course, based on portfolio data from multiple postgraduate students studying information systems. Four aspects were analyzed, though: the method's clarity, correctness, and efficacy; the method's selection; and the method's uniformity of application. To ascertain the causal relationship (correlation) between a project's success and analysis is done. In this instance, the correlation value can be determined by the data toolbar feature, data analysis, and the Microsoft Excel function, chi-square test.

As time goes by, every company now needs a good project management concept [2]. PT Eleska latki is engaged in electricity engineering personnel certification services, where PT Eleska latki obtains permission to carry out its business processes by applicable government regulations. The output from PT Eleska latki is a competency certificate that has a validity period of 3 years from the date of issue. In this case, a certificate validity period reminder management is needed so that the certificate can be used sustainably. Therefore, PT Eleska latki, in carrying out its business processes and facing increasingly unhealthy competition, requires innovations in terms of digital project development.

An information system designed by PT Eleska latki serves as a reminder to certificate holders that their certificates are about to expire. An information system for reminders was constructed. The management of PT Eleska latki believes that the current system needs to be improved in order to achieve the goals and objectives of the business. Reminding certificate holders three times—three months, two months, and one month—before the validity term expires is one of the company's tactics in this situation. Three reminders have not been accepted by the active system in the interim. The findings of the multiple-period study demonstrate that there is a sizable discrepancy between expectations and the actual execution of the extension. Researchers will analyze the impact of project execution strategies and make recommendations to meet the objectives of the organization and the project's success.

This research has several novelties that distinguish it from previous research. This novelty is expected to make a significant contribution to the field of project management, particularly in terms of the selection of project implementation methods. This research will focus on the Indonesian context, taking into account factors that are unique to Indonesia, such as different economic, political, and cultural conditions. This research also considers external factors that can affect project success, such as economic and political conditions. This is important to gain a more realistic understanding of the influence of project implementation method selection.

2. RESEARCH METHODOLOGY

The research was conducted using qualitative methods from a total of 67 project management portfolio data, of which 4 respondents did not fill in the data completely. The qualitative method is a descriptive research method that places more emphasis on observing a phenomenon and examining the substance or meaning of the phenomenon [3]. Since the acquired data is in qualitative form, it must be transformed into qualitative data at the analysis stage in order to facilitate the calculation of the value that will be used as a parameter.

To obtain relevant data related to the application of project implementation methods, ask questions about factors supporting project success. The questionnaire is as follows:
1. Has a clear development method been used in this project work?
2. In your opinion, is the development method appropriate? Or tends to be less effective?
3. In your opinion, what is the most crucial and determining phase in the method?
4. In your opinion, does the choice of this method support the success of this project?
5. In your opinion, which phase of the method is less successful or less effective?
6. Have you ever carried out a project using a
standard method (which has often been used in similar projects before)?
7. Does this method have adjustments in the middle of the road (adaptation) or stick to the rule (according to what was planned)?

The analysis in this research was carried out using a systematic literature review (SLR) by searching for relevant studies, and scientific articles from 2019 to 2023 using several keywords, namely:

<table>
<thead>
<tr>
<th>Sumber</th>
<th>Kata Kunci</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Scholar</td>
<td>Manajemen Proyek, Metode Pelaksanaan Proyek, Data Kualitatif, Korelasi Chi Square</td>
</tr>
<tr>
<td>Semantic Scholar</td>
<td>Chi Square</td>
</tr>
<tr>
<td>Science Direct</td>
<td>Manajemen Proyek, Korelasi Analysis</td>
</tr>
<tr>
<td>Elsevier</td>
<td>Management project</td>
</tr>
</tbody>
</table>

Table 1 SLR Keywords

3. RESULTS AND DISCUSSION

The questions formulated in the Project Management application are analyzed using several steps, namely:
A. Projects and Digital Projects

A project is a brief, one-of-a-kind attempt with a specific start and finish that aims to generate a good, service, or outcome (typically time-bound, and often constrained by financing or staff) undertaken to meet unique goals and objectives, usually to bring about desired change. Useful or added value, including information technology-based projects, information systems, and other infrastructure projects [6].

With the development of time and technology, all formal and non-formal organizations generally need to carry out digital projects to achieve their goals. Implementation of digital projects involves the implementation of software, hardware, and infrastructure, as well as changes in business processes and organizations necessary to achieve project goals [7].

B. Project Management

Project Management is also the art of coordinating and combining various resources such as human resources, finance, administrative records, and certain techniques to achieve specific goals within a specified time [1]. Based on PMBOK 6, the implementation of project management consists of 5 phases, namely: Initiate (initiation), Planning, Executing, Monitoring and Controlling, and Closing [8].

Based on one study, 90% of IT professionals believe that IT project management methods influence the level of project success (Terlizzi et al., 2016). This shows the importance of choosing the right IT project management method [3].

C. Project Implementation Methods

Project management methodology is a set of practices, principles, and techniques used to plan, implement, and manage projects [9]. Twelve different project management methodology types exist, specifically:

<table>
<thead>
<tr>
<th>No</th>
<th>Jenis Metodologi</th>
<th>Keterangan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agile</td>
<td>Applied to projects that change in the middle of the process because they have high uncertainty</td>
</tr>
<tr>
<td>2</td>
<td>Kanban</td>
<td>Applied to human resource management, marketing, organizational strategy, executive processes, and debt.</td>
</tr>
<tr>
<td>3</td>
<td>Waterfall</td>
<td>Large projects with clear objectives and no possibility of changing course midway through</td>
</tr>
<tr>
<td>4</td>
<td>Scrum</td>
<td>If a project always strives for continuous improvement</td>
</tr>
<tr>
<td>5</td>
<td>Lean</td>
<td>Large, medium and small projects. Suitable for project teams facing efficiency issue</td>
</tr>
<tr>
<td>6</td>
<td>Critical Path Method (CPM)</td>
<td>Small to medium size projects</td>
</tr>
<tr>
<td>7</td>
<td>Extreme Programming (XP)</td>
<td>Applied to small to medium teams because these projects often change according to the wishes of customers and stakeholders</td>
</tr>
<tr>
<td>8</td>
<td>Scrumban</td>
<td>This method makes the workflow clearer yet simpler by breaking the project down into smaller tasks.</td>
</tr>
<tr>
<td>9</td>
<td>Six Sigma</td>
<td>Applied to large organizations that have hundreds of employees or even more</td>
</tr>
<tr>
<td>10</td>
<td>Fince2</td>
<td>Applied to large corporate projects that have many project stakeholders</td>
</tr>
<tr>
<td>11</td>
<td>Critical Chain Project Management (CCPM)</td>
<td>Can be applied to both small and large companies, especially for projects such as construction, software development, and technology research and development</td>
</tr>
<tr>
<td>12</td>
<td>PMBOK</td>
<td>Applicable to both large and small projects, the framework includes: Initiation, Planning, Execution, Performance and closure.</td>
</tr>
</tbody>
</table>

Table 2 Project Management Methodology
Management development and implementation approaches are usually called project implementation methods which are the methods used to create and develop products, services, or results during the project implementation cycle. There are many different development approaches, and different industries may have different terms for them. Based on PMBOK7 Development approaches, project implementation methods consist of a Predictive life cycle and an Adaptive life cycle [10]. Predictive life cycle when project and product requirements can be determined, collected, and analyzed at the start of the project. This development approach can also be called the Waterfall Approach.

![Figure 1. Sample Predictive Life Cycle](image1)

An adaptive life cycle is useful when requirements are subject to a high degree of uncertainty and instability and are likely to change throughout the project. A clear vision is established at the start of the project, and initial known requirements are refined, detailed, changed, or replaced according to user feedback, the environment, or unexpected events [10]. The adaptive approach uses an iterative and incremental approach. However, compared to adaptive methods, iterations tend to be shorter and products are more likely to evolve based on input from stakeholders [10].

![Figure 2. Sample Life Cycle with Incremental Development Approach](image2)

**D. Chi-Square Correlation and Data Analysis**

According to the Big Indonesian Dictionary (KBBI), the meaning of correlation is a reciprocal relationship or cause and effect. In Mathematics, correlation is also a measure of how closely two variables vary about each other. In the context of analytical techniques, correlation is usually used to find the relationship between two variables that have quantitative properties. Meanwhile, according to probability theory and statistics, correlation is also called the correlation coefficient, which is a value that shows the strength and direction of the linear relationship between two random variables [11].

On qualitative data, correlative analysis was carried out using the Chi-Square Formula. The Chi-square test is used to determine the comparison between the frequency of observations and the frequency of expectations based on hypotheses on data taken to be observed [12]. Testing using Chi-Square is applied in cases where it will be tested whether the observed data frequency (frequency/observation data) is the same or not as the expected frequency or theoretical frequency.

The Chi-Square equation is as follows:

$$X^2 = \frac{(O_i - E_i)^2}{E_i}$$  \hspace{1cm} (1)

Where: $X^2$=Chi-Square
$O_i$= Number of Observation Frequencies
$E_i$= Number of Expectation Frequencies

Correlation calculations with Chi-Square are used through features available in Microsoft Excel. Apart from using the Chi-Square calculation, the correlation calculation
function with the Correl feature is also used. Also use the Correlation feature on the Data Analysis menu in Microsoft Excel, where this feature is useful for calculating correlation values between attributes in project implementation method factors.

To see the interpretation of the correlation between variables, the following are the calculation results criteria [14].

- **0**: There is no correlation between the two variables
- **>0 – 0.25**: Very weak correlation
- **>0.25 – 0.5**: Sufficient correlation
- **>0.5 – 0.75**: Strong correlation
- **>0.75 – 0.99**: Very strong correlation
- **1**: Perfect positive correlation
- **-1**: Perfect correlation is negative

Three factors are generally taken into consideration when interpreting correlation results: the direction, significance, and strength of the association between two variables.

**E. Project Management Tools**

The information gathered comes from a portfolio of 67 projects that were completed using the project management tool. Several aspects of the method selection process can be utilized to assess how different approaches affect a project's success, according to project management data. After that, the data was exported into Microsoft Excel. Seven characteristics are employed as instruments in the project implementation method factors to gather data on the influences on project success.

Three of the seven characteristics are connected to the phases or stages of project implementation, specifically:
1. The most crucial phase
2. Less successful phase
3. Adapt or stick to the rules

And four characteristics that are typically linked to project implementation techniques, specifically:
1. Use of clear development methods
2. The development method is appropriate and effective
3. Selection of methods to support project success
4. Use of standard methods

Project management techniques or project implementation strategies offer a guide for finishing a project. It is necessary to first observe broadly in terms of method use, method development, method selection, and whether or not methods are standard in order to determine how important the selection and/or application of methods is. who subsequently keeps an eye on the phases or stages of the project execution process. Thus, in order to measure the impact of implementation techniques on project success, the author of this research selected four characteristics that are generally associated with project implementation methods.

**F. Observation Process**

At the observation stage of this analysis, the correlation value of the attributes of the project implementation method is calculated using features in Microsoft Excel:
1. Calculate the Chi-Square value and the Correlation value

The number of respondents selected for the attributes selected from the project management portfolio dataset was calculated to obtain observation frequency figures, with the following results:

**Table 3. Observation Results**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Succeed</th>
<th>Fail</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Success</td>
<td>58</td>
<td>9</td>
<td>67</td>
</tr>
<tr>
<td>The Development Method is Clear</td>
<td>47</td>
<td>16</td>
<td>63</td>
</tr>
<tr>
<td>Exact method</td>
<td>49</td>
<td>14</td>
<td>63</td>
</tr>
<tr>
<td>Method Selectin</td>
<td>46</td>
<td>17</td>
<td>63</td>
</tr>
<tr>
<td>Standard Method</td>
<td>47</td>
<td>16</td>
<td>63</td>
</tr>
<tr>
<td><strong>Amount</strong></td>
<td><strong>247</strong></td>
<td><strong>72</strong></td>
<td><strong>319</strong></td>
</tr>
</tbody>
</table>

To calculate the Chi-Square value, you need the Expectation Frequency number or expectation value first, with the following results:

**Table 4. Expected Results**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Succeed</th>
<th>Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Success</td>
<td>51.87</td>
<td>15.12</td>
</tr>
<tr>
<td>The Development Method is Clear</td>
<td>48.78</td>
<td>14.21</td>
</tr>
<tr>
<td>Exact method</td>
<td>48.78</td>
<td>14.21</td>
</tr>
<tr>
<td>Method Selectin</td>
<td>48.78</td>
<td>14.21</td>
</tr>
<tr>
<td>Standard Method</td>
<td>48.78</td>
<td>14.21</td>
</tr>
</tbody>
</table>

From the results of the Chi-Square calculation, the value was 0.811069626. Then based on the corrl feature in Microsoft Excel, the correlation value is 0.983755987.

2. Using data analysis

Data based on observation results in Table 2 results in the following correlation values:
<table>
<thead>
<tr>
<th></th>
<th>Project Success</th>
<th>The development method is clear</th>
<th>Exact method</th>
<th>Method selection</th>
<th>Standard method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Success</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The development method is clear</td>
<td>0.9807</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exact method</td>
<td>0.9907</td>
<td>0.9982</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method selection</td>
<td>0.9738</td>
<td>0.9995</td>
<td>0.9957</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Standard method</td>
<td>0.9807</td>
<td>1.0000</td>
<td>0.9982</td>
<td>0.9995</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

A multicollinearity test must be used to confirm the relationship between the variables, though, as the correlation results between them are rather high, indicating a strong relationship. Finding out if the independent variables in a study have the same y components is the goal of the multicollinearity test [15]. Since this can result in skewed correlation values, the multicollinearity test is also employed to determine the strength of the relationship between the independent variables.

Intercorrelation is a linear relationship or a strong relationship between one independent variable or predictor variable and other predictor variables in a regression model. This intercorrelation can be seen by the correlation coefficient value between the independent variables, value Variance Inflation Factor (VIF) and Tolerance (TOL). If the VIF value is < 10 and the tolerance value is more than 0.10, it can be stated that multicollinearity does not occur [16]. Following are the similarities between TOL and VIF.

\[
\text{Tolerance} = 1 - r^2
\]

\[
\text{VIF} = \frac{1}{\text{Tolerance}}
\]

If the VIF value from the dataset analysis results is above 10, then to handle the impact of multicollinearity symptoms in this case use the Principal Component Analysis (PCA) method. PCA is used to minimize multicollinearity problems without having to remove independent variables that have multicollinearity relationships. This method aims to simplify the observed variables by shrinking (reducing) their dimensions [17].

4. CONCLUSION

PT Eleska Iatki, in carrying out business processes as a company engaged in electricity certification services in Indonesia, really needs digital project developments. Currently, PT Eleska Iatki has several information systems, one of which is a Reminder system or reminder of the validity period of competency certificates. In the process, the reminder for the validity period of this certificate will be maximized if it is developed by the procedures applicable in the Company, that the admin sends a reminder to the certificate holder 3 months before the validity period expires. Reminders are sent in the form of emails once a month.

The initial emergence of the Certificate Reminder System at PT Eleska Iatki was at the end of the 2nd semester of 2022 and began to be implemented effectively in the 1st semester of 2023. The implementation of this certificate reminder will be followed up with a certificate extension process. To assess the success of the system, one of the possible factors for implementing certificate extensions can be seen, namely the number of new certification implementations. The data that will be analyzed is how many extensions are scheduled for implementation in semester 2 of 2022 to semester 1 of 2023 compared to the number of certification implementations in the past 3 years. The data obtained is as follows:
Figure 4. Implementation of New Tests in 2019 and Extension in 2022

![Graph](image1.png)

Figure 5. Implementation of New Tests in 2020 and Extension in 2023

![Graph](image2.png)

From the graph above, there is a quite significant gap, namely as follows:

Table 5. New Test Gap in 2019 to Extension in 2022

<table>
<thead>
<tr>
<th>Month</th>
<th>Test 2019</th>
<th>Extension 2022</th>
<th>Gap</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>688</td>
<td>200</td>
<td>488</td>
<td>71%</td>
</tr>
<tr>
<td>July</td>
<td>666</td>
<td>625</td>
<td>41</td>
<td>6%</td>
</tr>
<tr>
<td>August</td>
<td>602</td>
<td>513</td>
<td>89</td>
<td>15%</td>
</tr>
<tr>
<td>September</td>
<td>883</td>
<td>544</td>
<td>339</td>
<td>38%</td>
</tr>
<tr>
<td>October</td>
<td>1017</td>
<td>405</td>
<td>612</td>
<td>60%</td>
</tr>
<tr>
<td>November</td>
<td>685</td>
<td>489</td>
<td>196</td>
<td>29%</td>
</tr>
<tr>
<td>December</td>
<td>688</td>
<td>200</td>
<td>488</td>
<td>71%</td>
</tr>
</tbody>
</table>

Table 6. New Test Gap in 2020 to Extension in 2023

<table>
<thead>
<tr>
<th>Month</th>
<th>Test 2020</th>
<th>Extension 2023</th>
<th>Gap</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>209</td>
<td>175</td>
<td>34</td>
<td>16%</td>
</tr>
<tr>
<td>July</td>
<td>225</td>
<td>149</td>
<td>76</td>
<td>34%</td>
</tr>
</tbody>
</table>

Table 5. New Test Gap in 2019 to Extension in 2022

Based on the data above, it can be concluded that the application of the certificate reminder system can reduce the gap and can even increase the implementation of certificate extensions. So it is necessary to develop a Certificate Reminder system by generating a 2nd and 3rd reminder.

From the results of the analysis of several project portfolios showing high correlation results from the attributes of project development and implementation methods, it can be recommended that the development of the Siremis system at PT Eleska Iatki must consider and analyze implementation method factors so that the objectives of the system are achieved. By achieving the goals of a system, a project can be said to be successful [18].

5. RECOMMENDATION AND SUGGESTION

A reasonably high correlation value of 0.99 is found in the results of the analysis of the Project Management portfolio dataset concerning the impact of project implementation methods with the attributes of method use, accuracy and effectiveness of methods, selection of methods, and standard methods on project success. If the characteristics of the implementation technique are correctly carried out, a project's development or implementation will be successful with this correlation value. Thus, it can be said that in order to achieve the intended results in line with the company's vision and mission, standard procedures must be established and methods that are appropriate
and targeted must be chosen during the implementation and development of the competency certificate reminder information system at PT Eleska Iatki.

REFERENCES


