The Adaptation of Delone and Mclean's Information System Model to Test The Success of the Erp-Sap Implementation in Middle-Level Management: A Study Case at PT Petrokimia Gresik

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Abstract: A recent implementation of ERP-SAP system at PT. Petrokimia Gresik allows much improvisation in the future. This research uses a model of application of successful models from DeLone & McLean. In this study, the model is used as a descriptive tool in measuring the success of ERP-SAP system applied to PT. Petrokimia Gresik. This research uses a qualitative approach with case study method to describe the success of ERP-SAP implementation in middle-level management at PT. Petrokimia Gresik. The results obtained from the adaptation of DeLone and McLean's information system success models show that the majority of respondents agreed with the adoption of a well-established ERP-SAP system through the success factors proposed. The continuous use of the ERP-SAP system and the satisfaction derived from the use of the ERP-SAP system ultimately impacted the increased net benefits of the respondents.

1 INTRODUCTION

The rapid advancement of technology has many benefits for the community. The development of information technology is also significant, particularly in companies. According to Romney and Steinbart (2015), the use of information technology in a company may aid decision makers to effectively filter and simplify information. The emergence and application of information technology in a company can ease business processes, thus increasing profits and further developing the company. An investment in information technology is intended to make a system that allows the whole management at all levels to obtain the same flow of information easily.

The ERP (Enterprise Resource Planning) System is the appropriate information system to solve the problems mentioned above. ERP itself is a concept to plan and organize various company resources that have influence from the top managers until the operational managers in a company so they can be optimally utilized to generate value-added for all stakeholders (Romney & Steinbart 2015). This concept aims to integrate business activities to be more responsive towards various needs of the company. One product of the ERP that is most commonly used nowadays is the SAP (Systems Applications and Product)

In Indonesia, many companies have implemented this ERP-SAP system. Some are successful in implementing them optimally, some don't. A company's success in implementing the ERP-SAP system depends on its readiness and all the components within because the implementation is not risk-free.

Halonen, et al (2013) said that DeLone and McLean can used as deskriptive tools to evaluated virtual learning environment. Suryani & Sumiyana (2014) in their research indicate that the use of technology by more capable and competence human resources can increase net benefit of system usage. There is relationship between service quality and user satisfaction (Tilahun & Fritz, 2015; Mudzana & Maharaj, 2015). In this research, the focus in middle level management in PT Petrokimia Gresik. Middle level management is an organization that overseas business units and responsible for departements on it (Daft, 2013).

2 METHODS

This research uses a descriptive qualitative approach with case study method. According to Ghony and Almanshur (2014), a qualitative research is a research done specifically on objects which cannot be researched statistically or with quantification. A study case is defined by Ghony and Almanshur (2014) as a research directed to collect data, make a meaning out of the data, and gain comprehension on the studied case. A case study doesn't represent the whole population and is not intended to take conclusions from the population. Data analysis techniques that used are interview and quetionnaire.

The research stage done by the researchers includes an interview with the information technology department (middle-level management) at PT Petrokimia Gresik that acts as the administrator of ERP-SAP. The interview covers the flow of the ERP-SAP system implemented in the company. Observations are done and questionnaires are distributed to the middle-level management that directly operates the ERP-SAP system at PT Petrokimia Gresik. The questionnaires contain questions on success factors of Delone & McLean's System. Afterwards, a descriptive analysis is done and a conclusion is deducted based on those results.

3 RESULTS AND DISCUSSION

3.1 The Implementation Phases of ERP-SAP System at PT Petrokimia Gresik

3.1.1 Chartering phase

The first phase of the implementation is the chartering phase. According to Markus et al. (2000), it is a stage that covers the needs for planning the system to be used in the organization.

The planning of ERP-SAP system implementation by PT Petrokimia Gresik started with a policy that's enacted by PT Pupuk Indonesia. The policy resulted from a conference by the whole holding members of PT Pupuk Indonesia done in 2012. This phase plans a system that will be implemented for all holding members of PT Pupuk Indonesia to integrate the business processes of all holding members, which eventually results in a decision to use ERP system from SAP product.

3.1.2 Project Phase

At the conference, some representatives were appointed by the holding members to be the business process owner of each module to be used. After they adjusted the module needs from the depiction of business process owner, the appointed consultant was EY. EY gave plans from the given depictions on what modules needed by the company. The total modules used were fifteen modules, including:

1. Financial Accounting (FA)
2. Controlling (CO)
3. Fund Management (FM)
4. Sales and Distribution (SD)
5. Materials Management (MM)
6. Production Planning and Control (PP)
7. Quality Management (QM)
8. Plant Maintenance (PM)
9. Business Process and Consolidation (BPC)
10. Human Capital Management (HCM)
11. Employee Self Service (ESS)
12. Manager Self Service (MSS)
13. Web Uang Muka/Web Anggaran (WUM)
14. Web Commerce (WCM)
15. Warehouse Application (WA)

After the fifteen modules were approved by the business process owners, EY consultants communicated those desired modules to the appointed implementer of SAP which is Abyor International. At the same time, the business process owners appointed a dedicated team—employees of the holding members assigned at the head office of PT Pupuk Indonesia serving as the firm's representative—to also be a representative in receiving the knowledge from the SAP implementer on each module. This knowledge will later be transferred by the team to the delegates of the holding members of PT Pupuk Indonesia, called key users. A key user will receive training on the usage of each SAP module to be used. Afterwards, key users that had received the knowledge transfer will return to their respective firms to transfer the knowledge to end users. The end user is the whole employee that will use the SAP modules on each of their business activities. In this phase, the whole preparation had been done for the success of ERP-SAP system implementation, from the readiness of the human resources to the systems used.

3.1.3 Shakedown Phase

The last phase of implementation is the shakedown phase or commonly known as the GoLive system. PT

Petrokimia Gresik did this phase in April 2016. They announced that they would do the GoLive system of ERP-SAP on media starting April 2016. The GoLive system that's done by PT Petrokimia Gresik was an application of the whole module in the ERP-SAP system that's been modified to company needs, corresponding to the results of the conference of the holding members of PT Pupuk Indonesia.

3.2 Analysis on the Success of ERP-SAP System Implementation at PT Petrokimia Gresik using the Adaptation of Information System Success Model by DeLone & McLean (1992 & 2003):

3.2.1 Information Quality

The reliability, timeliness, conciseness, understandability, and relevance of the system's output is the first topic stated in the questionnaire about information quality from the implemented ERP-SAP system at PT Petrokimia Gresik.

For the first question of information quality of the ERP-SAP system, the majority of respondents-more than 90%-were on the neutral to highly agree scale regarding the reliability of information output presented by the system. This means that respondents have obtained accurate and reliable information from the implementation of ERP-SAP system.

The second question emphasized on the timeliness of the information presented by the system. Respondents of PT Petrokimia Gresik answered on a neutral to highly agree scale regarding that the information produced by ERP-SAP system is up to date.

Respondents then answered a question regarding the conciseness of the information output of the system. The question stressed on whether respondents agree that the information is covering the things necessary for each department because of the integrated system. 81 respondents answered on a neutral to highly agree scale regarding the convenience to obtain all the needed information in one database.

Furthermore, there were 78 respondents saying that the information output became easier to understand after the implementation of ERP-SAP system. However, 11 respondents stated that the information presented was difficult to understand by individuals from other departments.

The last question stressed the relevance of the information output. 84 respondents agreed that the

system has presented relevant information with the needs of the user. The other 5 respondents stated that the information is still irrelevant to the needs of their job.

3.2.2 System Quality

The benchmarks in assessing the quality of the system are whether the ERP-SAP is easy to learn, reliable, has a quick response time, flexible, increases integration, and its user-friendliness. 78 respondents answered that the ERP-SAP system implemented is easy to learn. In the knowledge transfer from key users, they stated that ERP-SAP is easy to learn. For the system's reliability, 80 respondents answered that the ERP-SAP system is reliable enough in assisting the operational activities in each department. Only 9 respondents disagreed with the system's reliability.

The response time of the ERP-SAP system implemented at PT Petrokimia Gresik gained 77 positive feedbacks and 12 negative feedbacks from the respondents. They felt that the response time was quick. 74 respondents stated that ERP-SAP system is also flexible. However, a lot of respondents disagreed on its flexibility. 15 respondents stated that it's still difficult to modify or change the contents of the information.

The implementation of ERP-SAP system at PT Petrokimia Gresik aims to integrate the business processes and to the whole holding members of PT Pupuk Indonesia. The questions raised regarding the system's integration of the holding members of PT Pupuk Indonesia with the firm's subsidiaries gained positive responses.

The sixth question is on the user-friendliness of the ERP-SAP system. 7 respondents answered that the ERP-SAP system is not easy to use. They had difficulties operating the system in their operational activities. The other majority answered that the system is already user-friendly.

3.2.3 Service Quality

The questionnaire assessed the responsiveness, accuracy, reliability, technical competence, and treatments by the system's administrator, which is the information technology department at PT Petrokimia Gresik. More than 50% of the respondents said that the knowledge transfer done by the key users to the end users was appropriate and sufficient. The materials obtained by the end users were deemed as sufficient to run the ERP-SAP system. More than 50% of the respondents gave positive feedback regarding the support provided by the IT department.

They agreed that the department was quick when giving a response with a good attitude.

3.2.4 Use of the System

Use of the system by the end users is influenced by the information quality, system quality, service quality, and the reciprocal effect of customer satisfaction and net benefits for the end users. Questions on the usage of the system were periodically given to the respondents. The majority gave neutral to positive feedbacks. This shows that the respondents are almost always using the ERP-SAP system in their job. However, there's a small part of the respondents that didn't use the ERP-SAP system at all.

3.2.5 User Satisfaction

Most respondents stated that the implemented ERP-SAP system corresponds with their expectations in making their jobs quicker, thus making it more efficient and effective. Out of 89 respondents, there were 10 respondents that expressed their dissatisfaction towards the ERP-SAP system. The abundant amount of errors and the lack of knowledge transfer they received made their satisfaction towards the ERP-SAP system not as significant. There were also respondents who completely disagree with the convenience offered by using the ERP-SAP system.

3.2.6 Net Benefits

Almost everyone felt a positive impact on their job with the implementation of ERP-SAP system, only 4 respondents felt the other way. Respondents in the middle level of management felt that the implementation of ERP-SAP conveys positive impact in improving their efficiency as the decision makers. However, some other respondents didn't really sense that positive impact coming from the implementation of ERP-SAP.

Lastly, is whether the implementation of ERP-SAP enhances the communication in the organization. Again, the majority of respondents agreed with the improvement in organizational communication. Some respondents felt neutral about it, while some others disagreed with it.

3.3 Relationship Analysis between Factors/Variables of Success

In the success model of DeLone & McLean's information system, the factors that have been measured will be further analyzed to see the relationship between those factors. Unlike the quantitative method which can use tools to get the exact numbers to show the relationship, the qualitative method has difficulties in accurately quantifying the relationship.

In this paper, the researchers analyzed the relationship by interpreting the answers given by the respondents. All the responses received were fully answered, thus enabling the researchers to do so. The interpretation is done by looking at the relationship of information, system, and service quality with the system usage and user satisfaction. Afterwards, the researchers interpret the correlation of the use of the system and user satisfaction towards the net benefits. Lastly, interpretation is done on the relationship of the use of the system towards user satisfaction. Relationships between those factors are analyzed by comparing all the responses given and observing if a positive feedback in one area will also result in another.

Firstly is the measurement of information, system, and service quality towards the system usage and user satisfaction. Overall, respondents who are satisfied with the quality tend to utilize the ERP-SAP system more frequently. Vice versa, the dissatisfied respondents tend to use the ERP-SAP system less frequently. There's a linear influence between the information, system, and service quality towards the system usage and user satisfaction.

Next, is measuring the effect of system usage towards the net benefits. Respondents who used the ERP-SAP system felt that the utilization helped them in improving the efficiency and quality of their job, giving them a positive impact. When measuring the user satisfaction in relation to the net benefits, the overall respondents felt satisfied as the ERP-SAP system improved their work.

The last measurement is the system usage and user satisfaction. Respondents who used the ERP-SAP system frequently felt satisfied with it for meeting their expectations in an overall sense.

The majority of the responses received showed a positive relationship between variables. When the users feel that the system is providing a high quality of information, system, and service, they will utilize the ERP-SAP system more frequently and will be satisfied with it, leading to an increase in their job performance.

However, the relationship also applies conversely. When they feel that the ERP-SAP system is providing a low quality of output, they are dissatisfied with it, thus leading to less frequent usage of the system and lower job performance.

4 CONCLUSION

Based on the interviews with the managers and the head of IT department at PT Petrokimia Gresik, and the questionnaires spread throughout the middle-level managers in all departments, we believe that the implementation of the ERP-SAP business system is successful. The information system success model by DeLone & McLean were used to describe the implementation's success by using the 6 success factors. From the data obtained through the questionnaires, the majority of respondents agreed that the implementation of the ERP-SAP system is already appropriate and sufficient. The information output is reliable, timely, concise, understandable, and relevant to the needs of their job. The system quality of ERP-SAP received positive feedback from the respondents, saying that it is easy to use, reliable, responds quickly, flexible, integrative, and user-friendly. The service quality provided by the IT department of PT Petrokimia Gresik is also deemed as appropriate by the respondents. The use of the system and user satisfaction also received positive responses. Lastly, the net benefits from the usage of ERP-SAP give positive impact towards the respondents' job performance. The impact of these six factors shows a linear relationship. From the three dependent variables (information, system, and service quality) to the system usage and user satisfaction, the result shows that a high quality of output will drive users to utilize the ERP-SAP system more frequently in their job. A continuous usage of the ERP-SAP system and the satisfaction gained from using it will improve the net benefits for the users.

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