ERP Implementation in Crisis Management: A Case Study of Government-Owned Electricity Company

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Abstract. Enterprise Resource Planning plays an outstanding role in integrating business functions and facilitating the exchange of information and communication. Through the ERP system integration, significant speed and productivity gains become the objective that the company wants to achieve directly and comprehensively. One of the companies in the public service sector that potentially implements ERP is the state-owned company in the electricity sector. Unfortunately, until now there are still problems that often occur such as mass power outages, electricity supply crises, and other technical and nontechnical problems. By adopting ERP for crisis management, the company can categorize and meet the time to resolve (TTR) incidents and problems that are set to analyze access management to determine the level of security of the company’s location, so the company can determine the equipment in each location including access rights. This research will identify the implementation of ERP that is suitable for company crisis management implementation.

Keywords: ERP, crisis management, incidents, problems.

1. Introduction

Nowadays, Information technology has become a critically important part of all industries and activities. Few areas of industrial, commercial and service activities require information technology to achieve their goals [1]. It has been applied to increase productivity and help achieve quality, time and satisfaction standards for consumers and employees, which has aimed to obtain a specific long or short-term goals in the business world through a series of systems consisting of information systems and supporting infrastructure. The excellent solution today is the Enterprise Resource Planning or better known as ERP. ERP can integrate all existing operations into the functional area of the company, for example between departments and between different locations [2]. With this system integration, data previously obtained from different systems to combine into one system in a standard format. So there are no practical differences between jobs, between departments and between different sites [3]. One of the companies in public service sector that potentially implements ERP is the state-owned company in the electricity sector that ensures everyone in Indonesia access electricity. Companies that have high risks such as electricity companies must be able to handle problems precisely and quickly to always provide the best service for customers. Unfortunately, until now there are still problems that often occur such as mass power outages, electricity supply crises and other technical and nontechnical problems. To solve the problem, the company needs IT breakthroughs such as integrated crisis management by adopting ERP that can be adjusted to IT Service Management standards such as ITIL [4]. By adopting ERP for crisis management, the company can categorize and meet the time to resolve (TTR) incidents and problems.
that are set, analyze access management to determine the level of security of the company’s location, so the company can determine the equipment in each location including access rights. This research will identify the implementation of ERP that is suitable for company crisis management implementation.

2. Literature Review

The main objective of implementing ERP is to solve old system problems, provide a single and integrated technology platform thus helping companies gain a competitive advantage and thus compete globally [5]. In particular, ERP plays an outstanding role in integrating business functions and facilitating the exchange of information and communication. Through the ERP system integration, significant speed and productivity gains can be achieved [6]. ERP systems can be a useful tool for companies to build a robust infrastructure for information systems and to enable management to make better decisions based on accurate and timely information. Moreover, this system improves product quality and customer response and increases the exchange of information and the quality of information between different departments within the company. It also exceeds business limits for suppliers, customers, and other partners in the supply chain [7]. Ultimately, this will improve overall business performance, helping to gain a competitive advantage in the global economy and increase long-term profitability. But on the other hand, ERP system implementation is very expensive and time-consuming [5]. The reason for this is the fact that many companies become ERP systems and limit the market share of ERP systems. Many leading companies in the world have successfully implemented ERP systems such as Cisco costs for operational has been lowered and sales increased considerably since implemented ERP. Chevron Texaco has improved supply chain management by implementing an ERP system. Earns $ 100 million net annual profit. The IBM R/3 app was one of the most successful. Another successful ERP implementation, Indian power distribution utilities/companies (known as Discoms) faced a financial crisis in 2003 amid monopolistic activities. Some Discoms’s do not accept a minimum return (ROR). The electricity sector has a large deficit due to the deteriorating financial situation. To overcome this problem, the Indian government adopted ERP. The main purpose of using an ERP solution is to improve operations and efficiency, reduce costs and improve customer service, as well as adhere to standard settings and reduce ATC losses [8]. However, there have been some significant failures. Dell believed that the ERP system could not handle its sales volume and suffered a financial loss of approximately $200,000 when the ERP system was designed for two years [9]. It becomes the essential reasons why DELL cancels the ERP project and lost $115 million. Another symbolic case was FoxMeyer. The pharmaceutical giant incurred a loss of $100 million and failed after implementation failure.

3. Research Methodology

This paper uses observation, informal interviews, and secondary data as sources of information. Observations were conducted by observing the existing process of the incident and problem management in the organization. Meanwhile, informal interviews were conducted with management, staffs and users of the state-owned company in the electricity sector. In addition, the process of scheduling becomes a consideration for the actual session, which informants should have proper experiences and knowledge in terms of in electricity field and was intended to emphasize relevant electricity issues and challenges that may be appropriate to crisis management. Secondary data sources were the result of a review of publications on the ERP implementation in the industry and crisis management, a search engine that indexes references and summaries in the broad areas of electricity. After the data is collected, then modelling the existing crisis management business processes, from the existing business processes then analyzed and implementing ERP as crisis management.

4. Result and Analysis

As a result, the incident management system has two basic principles that company should considered wisely and carefully. First, the local-aware structure must be flexible enough to easily scale, especially as additional resources outside of the jurisdiction, and to add to the level of demand imposed by
escalating events. Secondly, it should use proper tools and mechanism in day-to-day emergencies with good coordination among team members to forms the basis for an expanded structure for dealing with disasters. Many incident management systems have been devised over the years and their use remains intermittent to predict worst-case scenarios, while the resources and strategies of many agencies and jurisdictions to manage large incidents have been reported to be improved through several phases especially if the requirement asked to [12]. The following is a list of major incident cases in state-owned company in the electricity sector:

**Table 1. Major Incident**

| Case          | Major Incident Case |
|---------------|---------------------|
| System Failure| System failure is the inability of a system or component to perform the functions required in accordance with its specifications |
| Virus Attack  | A virus is a program or application that can spread into other programs or documents that aim to steal data and damage data or documents |
| Force Majeure | Force Majeure is an event or situation that occurs outside the authority of the parties concerned |

| Missed payments, double charged customer, error work flow, 404 not found, timed out. |
| Broken operating system, slow response, corrupted file, damage process |
| Fire and earthquake |

**Figure 1. Crisis Management Business Process Existing**
Nowadays, the development of information technology offers many new opportunities so that the exchange of data, information and knowledge can be obtained respectively even when the government is constrained by distance, time and place to provide a means to improve performance. Therefore, incident management systems need to be aware that small mistakes maybe exposed to competitors or illegal people in order to take advantage of the opportunity to profit from the trouble that has occurred [11]. Freedom of information in terms of availability and accessibility requires consideration of the context, purpose, and interests of the community to promote community understanding and promote citizen support. Actually, the challenge of implementing a particular regulation is related to an attempt to develop commitment and consistency. On the other hand, large gaps between policies, plans, and realizations can degrade implementation. It became more complicated when bureaucracy tended to maintain the status quo rather than develop public transparency and the ability to access the necessary information [10]. The concept of incident command has existed in law enforcement and fire brigade for many years, and has emerged as a collection of organizational rules designed to meet the needs of field commanders and operations forces at the forefront of emergency response [12].

Table 2. Crisis Management Business Process Existing Explanation

| No | Activity                                      | Authority          | Explanation                                                                                           |
|----|----------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------|
| 1  | Find indications of major incidents          | 2nd Level Support  | Report incidents to the Helpdesk via email, phone, self-service and walk in                          |
| 2  | Perform recovery resolution                  | 2nd Level Support  | Helpdesk receives incident reports from users via email, phone, chat, self-service, and walk in       |
| 3  | Escalate                                     | 2nd Level Support  | Escalating by IT support to service management and deputy managers to hold discussions regarding major incident solutions that cannot be resolved by 2nd level support |
| 4  | Receive reports regarding major incidents   | Project Direction  | Receive reports from IT support regarding major incidents                                             |
| 5  | Escalating major incidents                  | Project Direction  | Escalating by deputy managers and management of service management to senior managers and heads of STI divisions related to major incidents that cannot be resolved by IT support |
| 6  | Receive major incident reports              | Executive Decision | Receive reports of major incidents that cannot be resolved                                           |
| 7  | Discussion about the major incident         | Executive Decision | Make discussions with senior managers, STI division heads, deputy managers, service management, and IT support to find the best solution related to handling major incidents. |
| 8  | Receive reports                              | Third Party        | Receive reports on major incidents that IT support cannot resolve                                     |
| 9  | Perform resolution and recovery              | Third Party        | Perform resolution and recovery of major incidents. resolution and recovery that is expected to be major incidents can be resolved and returned to normal |
| 10 | Report information on handling major incidents | Third Party         | Provide reports to IT support that handling major incidents can be resolved                           |
| 11 | Receive major incident reports              | 2nd Level Support  | Receive reports from third parties regarding major incidents that have been resolved                 |
| 12 | Making a report on handling major incidents | 2nd Level Support  | Making reports from third parties related to major incidents that have been resolved                  |
| 13 | Send reports on handling major incidents     | 2nd Level Support  | Sending reports to IT Support that handling major incidents can be resolved                           |
| 14 | Receive and review reports                  | Project Direction  | Receive and review reports that have been made by the 2nd level of support as an evaluation material so that the problem of major incidents that have successfully resolved does not happen again |
| 15 | Send major incident reports                 | Project Direction  | Send major completed incident reports to senior managers and STI division heads                      |
| 16 | Receive reports and review reports          | Executive Decision | Receive and review reports related to major incidents that have been resolved                       |
Figure 2. ERP Management Crisis of Major Candidates Service Incidents
Companies are realizing that in order to survive in a global business environment, organizations need to improve not only the efficiency of their organizations, but also their entire supply chains. This is because today's competition extends not only between companies, but also into the supply chain. For these reasons, many companies need to stay current and invest heavily in developing and implementing better technologies and systems, such as ERP systems [5]. Inherently, ERP systems are a useful tool for companies to build a strong information systems infrastructure and enable managers to make better and more informed decisions on time. It can also improve product quality and customer responsiveness, and improve information sharing and information quality between various departments within the company. Ultimately, this should improve overall business performance and help you achieve a competitive advantage in the global economy and increase long-term profitability [9].

Table 3. ERP Management Crisis of Major Candidates Service Incidents Explanation

| No. | Activity | Authority      | Information                                                                 |
|-----|----------|----------------|-----------------------------------------------------------------------------|
| 1   | Reporting an incident | User           | Report an incident to the Service Desk. Reporting tools that are via ERP System |
| 2   | Receive reports | 1st Level Support | Service Desk receives incident reports from users.                          |
| 3   | Analyse and identify the status of an incident | 1st Level Support | Identify the status of an incident based on reports, tools, users or IT Support |
| 4   | Recording of incident tickets | 1st Level Support | Recording incident reports includes the following information:  
  a. a reporter's identity (name, organization, location, email address, telephone);  
  b. report source  
  c. a description of the signs / symptoms of the incident, time of occurrence and supporting evidence files.  
Once an incident has been recorded, the status will change to on progress |
| 5   | Receive candidate reports on major reports | 2nd Level Support | Receive reports of major incident incidents by the Service Desk for immediate resolution and recovery by IT Support |
| 6   | Initial diagnosis | 2nd Level Support | Check whether there have been previous similar incidents / complaints (known errors) in the log (Knowledge Base). Preliminary diagnosis is expected to provide input for the overall handling of incidents and if possible can provide solutions to incidents |
| 7   | Escalate | 2nd Level Support | Provide reports regarding major incidents to Deputy Managers and Processing Management Services |
| 8   | Receive major incident reports | Project Direction | receive reports of major incidents by IT Support |
| 9   | Resolution and Recovery | 2nd Level Support | Perform resolution and recovery of major incidents. the resolution and recovery expected of major incidents can be resolved without the need to escalate |
| 10  | Escalate | 2nd Level Support | Provide reports that major incidents cannot be resolved by IT Support to Deputy Managers and Management of Service Management. |
| 11  | Conduct a discussion of major incident solutions | Project Direction | Hold discussions with the Deputy Manager with the support team to find the best solution related to handling major incidents. Matters that need to be discussed are: - The first way to handle major incidents - the impact of handling it - how long will it take to handle a major incident |
Table 3. ERP Management Crisis of Major Candidates Service Incidents Explanation

| No. | Activity                                      | Authority          | Information                                                                                                                                                                                                                                                                                                                                 |
|-----|-----------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12  | Do the solutions that have been found         | Project Direction  | Provide reports on the discussion of solutions that have been found by IT Support, Deputy Management, and Processing Management Services related to major incidents that cannot be resolved by IT Support.                                                                                                                                                                                                                     |
| 13  | Receive a solution report                     | Executive Decision | Receive reports on major incident solutions that have been found by IT Support, Deputy Managers, and Processing Management Services.                                                                                                                                                                                                                                                                   |
| 14  | Make decisions                                | Executive Decision | Make decisions by senior managers and STI division heads regarding solutions to handling major incidents.                                                                                                                                                                                                                                                                                                               |
| 15  | Receive reports                               | Third Party        | Receive reports about major incidents that IT Support cannot resolve.                                                                                                                                                                                                                                                                                                                                        |
| 16  | Make a resolution and recovery                | Third Party        | Perform resolution and recovery of major incidents. Resolution and recovery that are expected to be major incidents can be resolved.                                                                                                                                                                                                                                                                            |
| 17  | Report information on handling major incidents| Third Party        | Provide reports to IT Support that handling major incidents can be resolved.                                                                                                                                                                                                                                                                                                                                |
| 18  | Receive major incident reports                | 2nd Level Support  | Receive reports from Third Party regarding major incidents that have been resolved.                                                                                                                                                                                                                                                                                                                            |
| 19  | Monitoring and maintenance                    | 2nd Level Support  | Monitoring and maintaining services related to major incidents that have been resolved so that services remain stable.                                                                                                                                                                                                                                                                                  |
| 20  | Make a report on handling major incidents     | 2nd Level Support  | Make a report regarding major incidents that have been resolved.                                                                                                                                                                                                                                                                                                                                        |
| 21  | Send reports to project directions            | 2nd Level Support  | Sending major incident reports that have been resolved to the Deputy Manager and Management of Service Management.                                                                                                                                                                                                                                                                                     |
| 22  | Receive reports and review major incident reports | Project Direction | Submitting and reviewing reports that have been made by 2nd level of support as evaluation material so that the major issues of successful incidents at Resolved do not recur.                                                                                                                                                                                                                               |
| 23  | Send report to executive decision             | Project Direction  | Sending major incident reports that have been resolved to the Senior Manager and STI Division Head.                                                                                                                                                                                                                                                                                                 |
| 24  | Receive report and review report              | Executive Decision | Receive and review reports related to major incidents that have been resolved.                                                                                                                                                                                                                                                                                                                               |

5. Conclusion

ERP systems can be a useful tool for companies to build a robust infrastructure for information systems and to enable management to make better decisions based on accurate and timely information. The main difference from existing crisis management and targeting after using an ERP system is the existence of process automation and integrating internal and external information flow within the organization that makes the process of handling incidents and problems more effective and efficient. In addition, each incident and problem can be categorized to be resolved according to a predetermined time to resolve so the company can resolve the problem and even prevent it to maintaining the quality of service to customers.

6. References

[1] S Saberi, 2016 An Incident Management System for Debt Collection in Virtual Banking,” in (IJACSA) International Journal of Advanced Computer Science and Applications, 7(12).

[2] MA Abd Elmonem, ES Nasr and MH Geith, 2016 Benefits and challenges of cloud ERP systems – A systematic literature review, in Future Computing and Informatics Journal, 1(2), pp. 1–9.
[3] PP Dewi, N Luh and P Asriani, 2019 Analisis Faktor-Faktor Kesuksesan Penerapan Enterprise Resource Planning (ERP) Pada Perusahaan Pengguna ERP Wilayah Bali, 5(1), pp. 39–48.

[4] M Sarnovsky and J Surma, 2018 Predictive Models for Support of Incident Management Process in It Service Management, in Acta Electrotechnica et Informatica, 18(1), pp. 57–62.

[5] AS Shatat, 2015 Critical success factors in enterprise resource planning system implementation: An exploratory study in Oman, The Electronic Journal of Inf. Sys. Evaluation, 18(1), p. 36-45.

[6] N Karia, 2016 Enterprise Resource Planning (ERP). Systems in the Egyptian Higher Education Institutions: Benefits, Challenges and Issues, in International Conference on Industrial Engineering and Operations Management, pp. 1935–1943.

[7] A Badewi, 2018 ERP benefits capability framework: orchestration theory perspective.

[8] T Bhattacharya and P Chellasamy, 2016 An analysis of ERP security issues in ERP implementation process of Indian power distribution companies (Discoms). 2(7), pp. 34–38.

[9] A Jayakody, EMMN Samaranayake, NNWG. Punchihewa and BVR. Jeewantha, 2019 Impact of Critical Success Factors on ERP Implementation: Typical Organizations in Sri Lankan Context, Global Journal of Comp. Sci. 19(1).

[10] M. Lubis, TF Kusumasari and L Hakim, 2018 The Indonesia Public Information Disclosure Act (UU-KIP): Its Challenges and Responses, Int. J. of Electrical and Computer Engineering, 8(1), pp. 94–103.

[11] M. Lubis and FA Maulana, 2010 Information and Electronic Law Effectiveness (UU-ITE) in Indonesia, Proc. IEEE CITSM 2010.

[12] RW Perry, 2003 Incident Management Systems in Disaster Management, Disaster Prevention and Management 12(5): 405-412.

[13] M. Lubis and FA Maulana, 2010 Information and Electronic Law Effectiveness (UU-ITE) in Indonesia, Proc. IEEE CITSM.