Analysis of ERP Critical Failure Factors: A Case Study in an Indonesian Mining Company

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Abstract

ERP is a useful application for companies to run day-to-day operations by automating business processes, but the complexity and difficulty of deploying ERP systems causes unanticipated implementation failures. Around 70% of ERP implementation fails to produce the expected benefits, and three-quarters of these projects fail. This study aims to uncover potential reasons that cause the failure of ERP system adoption using Company XYZ, a mining company as the case. A questionnaire was distributed to its management and employees. TOPSIS approach was used to rank the variables according to their significance in affecting the failure of ERP systems implementation. The findings revealed that the two most important critical failure causes for ERP implementation are a bad understanding of the organization's business processes and poor business process reengineering. The company needs to conduct a deeper analysis of the existing business processes in the business unit to be able to determine more appropriate business process reengineering for ERP implementation in the future. Companies and academics can utilize the study's findings as a helpful resource to identify the cause of ERP implementation failure.

Keywords: ERP (Enterprise Resource Planning), CFF (Critical Failure Factors), TOPSIS, Failure Implementation ERP, Mining Company

Introduction

ERP system is a software application that enables the integration of data to support a typical company's main functions (Kirmizi and Kocaoglu 2020; Motiwalla and Thompson 2012). ERP is used by businesses to get visibility into their company processes and to be prepared for various dynamic situations (Goundar 2021). Companies can integrate all business processes into one system using ERP (Motiwalla and Thompson 2012). ERP also allows companies to have accurate, real-time, and

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accountable data (Ahmad and Mehmood 2020). This capability supports companies to have good corporate governance standards, bring a lot of profits to companies, and increase their efficiency.

Although ERP is a very useful application for companies, many organizations have failed to deploy and implement ERP systems. Failure in ERP implementation remains frequent to produce the expected advantages (Chakravorty et al. 2016; Jaeger et al. 2020; Panji Wicaksono et al. 2022). ERP implementation failures are not only experienced by small companies, but multinational companies such as Nike, Hershey, etc. as well (Amid et al. 2012).

The success or failure of ERP systems adoption is influenced by several factors (Kirmizi and Kocaoglu 2020). However, previous studies have been focusing on critical success factors (CSFs), which are one of the most used terms in ERP system literature (Amid et al. 2012), with fewer studies attempting to identify critical failure factors. According to (Prasetyo et al. 2019) just 6% of all ERP articles presented CSF while studies examining ERP CFF were fewer than 1%. It should be noted that reviewing and analyzing ERP failure experiences through research initiatives is extremely beneficial for preventing future missteps (Mahmood et al. 2020). As a result, failure analysis, particularly CFF in ERP system implementation, can be considered a research concern.

Many companies have implemented ERP applications to gain a competitive advantage, including Company XYZ Company XYZ is a mining company in Indonesia that has multiple businesses. It provides sales of precious metals, nickel, coal, bauxite, and exploration services. Company XYZ has six business units spread across five provinces in Indonesia. All business units are under the auspices of the head office in Jakarta, Indonesia.

Company XYZ has implemented ERP in its head office and all business units since 2016 to support its digitalization transformation solutions. The company selected SAP, which is widely used by large companies in Indonesia (Muhtar 2022). SAP includes business processes derived from best practices that are readily used by the company. These applications help mining companies manage production reports, improve transportation and logistics efficiency, manage company assets, and create financial reports. Using ERP, it is easier to integrate and track data between departments and improve data visibility. A higher quality and more accurate data produced by ERP leads to improved analysis to support management decision-making.

Implementation of ERP began in 2017 and went live in 2018. Implementation and go-live went smoothly but after go-live, it was realized that there were some unidentified problems. This can be seen from the financial statement issued by the ERP system which is incorrect and cannot be accepted by the auditor. The implementor consultant reviewed the implemented business processes but could not find the cause of the implementation failure. This failure caused obstacles in the company's operations because they still had to manually record and calculate financial reports from existing transactions.

Many failures and successes of ERP implementation have been discussed in previous studies (Amid et al. 2012; Chakravorty et al. 2016; Gargeya and Brady 2005; Ghayas et al. 2022; Hong and Kim 2002; Jaeger et al. 2020; Jarrar et al. 2000; Kumar and Gupta 2012; Yadav et al. 2020; Malaurent and Avison 2015; Motiwalla and Thompson 2012; Panji Wicaksono et al. 2022; Peci and Važan 2014; Prasetyo et al. 2019; Ravasan and Mansouri 2014; Umble et al. 2003; Wong et al. 2005; Xue et al. 2005). Research by Prasetyo et al. (2019) discussed the critical failure factors of ERP implementation in a company, it is necessary to evaluate the failure of ERP implementation so that the company knows the mistakes made and prevents failures in the next implementation (Prasetyo et al. 2019).

Therefore, this research was conducted to investigate the most significant factors causing the failure of ERP implementation or critical failure factors (CFF). ERP CFFs were analyzed using questionnaire data and prioritized using the TOPSIS method. The primary factors obtained from the research results can be used as a reference for decision-making to improve the re-implementation of the business unit so that the chance of failed ERP implementation can be reduced.

Despite its popularity, ERP implementations continue to fail at a high rate. According to (Prasetyo et al. 2019), ERP implementation failure is still on a scale of 67-90%. Meanwhile, compared to the Critical Success Factors (CSF) aspect, the Critical Failure Factors are rarely discussed by previous studies.

Another survey reported that 70% of ERP implementations fail to produce the expected benefits (Al-Mashari 2000).

Several previous studies discussed the failure of ERP implementation from various perspectives. There are many ERP implementation failures in famous companies like Hewlett Packard, Nike, and Fox Meyer Drugs, which the latter ended up bankrupt. Hewlett-Packard lost $160 million and Nike $100 million (Peci and Važan 2014). Research by (Wong et al. 2005) showed that there are 14 critical failure factors in ERP implementation. The research conducted by (Amid et al. 2012) identified and categorized 35 critical failure factors of ERP implementation in companies in Iran.

Several methods can be used to determine the critical failure factors of ERP such as Robust EFA, TOPSIS, and Fuzzy Dematel. The Robust EFA method is often used to determine the most dominant factor among other factors, in this case, the most dominant factor causing ERP implementation failure. A study by (Amid et al. 2012) used Robust EFA to identify patterns in multidimensional entities that are then applied to the creation of measurement scales. Its main goal is to condense many observed variables into a smaller set of components to improve interpretability and find hidden structures in the data. Then in the research conducted by (Prasetyo et al. 2019), the data analysis method was not specifically stated but it was explained that data analysis was carried out using the SmartPLS and SPSS applications. In a separate study (Yadav et al. 2020), data analysis was carried out by using the TOPSIS method to get the highest ranking that caused the failure of ERP implementation. The TOPSIS method is one of the most widely used techniques for multi-criteria decision-making analysis (Yadav et al. 2020). In another study by Visalakshmi et al. (2015) Fuzzy DEMATEL TOPSIS was used to evaluate the financial performance of GREENEX industries (Visalakshmi et al. 2015). A framework structured on accounting-based financial performance using sixteen financial ratios to rank fourteen different companies was proposed. Weights were assigned to criteria and sub-criteria using the DEMATEL methodology, with ranking done using the TOPSIS method. The analysis helps the revision of financial information as well as the financial position of the best firms (Visalakshmi et al. 2015).

Research Method

The research method used in this study is in line with the research objective, which is to obtain the most crucial factor affecting the failure of ERP implementation using the TOPSIS method. Based on the literature review, there were 35 critical failure factors and their categories are seen in the Appendix. Then a questionnaire was developed by adopting these factors to collect data. Afterward, the collected data was prioritized according to its significance in affecting ERP implementation failure using the TOPSIS method.

A questionnaire was developed to examine the factors adopted from (Amid et al. 2012). Primary data were collected through a structured questionnaire using a five-point Likert scale. Respondents gave responses from 1 to 5, where 1 means irrelevant, 2 is less relevant, 3 is quite relevant, 4 is more relevant and 5 very relevant. This research uses purposive sampling. The total number of samples was 62, taken from employees to management at the head office and the processing precious metals business unit who were involved in ERP implementation, especially the key users of the project. The research design can be seen in Figure 1.

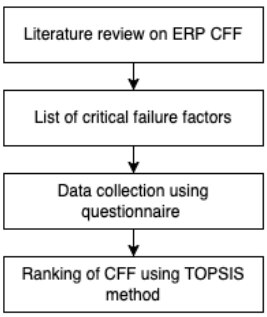

Figure 1. Research Design

TOPSIS is one of the most widely used strategies for determining the relative importance of several options (Hwang and Masud 1979). TOPSIS is used in this research because is the most effective, straightforward, and practical multi-criteria decision-making method, this method has also been successfully used to rank ERP critical failure factors in previous studies (Yadav et al. 2020). According to this technique, a positive ideal solution maximizes the benefit criterion while minimizing the cost criteria, whereas a negative ideal solution maximizes the cost criteria while minimizing the benefit criteria. TOPSIS is the most powerful multicriteria decision-making tool available, and it's also the most basic and straightforward to use (Ballı and Korukoğlu 2009). The TOPSIS method is broken down into seven steps, as follows (Assari et al. 2012).

1) Construct the decision matrix (A). The purpose of this matrix is to get the normalized value of the existing parameters.

$$A = (a_{ij})m_x n = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{21} \\ \vdots & \vdots & \vdots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix} \quad \text{Equation (1)}$$

2) Calculate the decision matrix that has been normalized. The adjusted value Pij is determined as follows:

$$P_{ij} = \frac{A_{ij}}{\sqrt{\sum_{i=1}^{m} {A_{ij}}^2}} \quad \text{Equation (2)}$$

3) Calculate the normalized weighted decision matrix. The following formula is used to calculate the weighted normalized value vij:

$$v_{ij} = P_{ij}\, x\, w_j \quad \text{Equation (3)}$$

where v_{ij} is the weight of the j^{th} criterion and $\sum_{j=1}^{n} w_j = 1$

4) Determine the solutions for the positive ideal (A*) and negative ideal (A–).

$$A^* = \{(\max v_{ij}), (\max v_{ij})_{,i,j=1,2,\ldots,m}\} = \{v_{1+}, v_{2+}, \ldots v_{n+}\} \quad \text{Equation (4)}$$

$$A^- = \{(\min v_{ij}), (\min v_{ij})_{,i,j=1,2,\ldots,m}\} = \{v_{1-}, v_{2-}, \ldots v_{n-}\} \quad \text{Equation (5)}$$

5) Determine the separation measures of each alternative from the positive and negative ideal solutions, respectively.

$$Si^* = \sqrt{\sum_{j=1}^{m} (v_{ij} - v_j^*)^2, j = 1,2, \ldots, m} \quad \text{Equation (6)}$$

$$Si^- = \sqrt{\sum_{j=1}^{m} (v_{ij} - v_j^-)^2, j = 1,2, \ldots, m} \quad \text{Equation (7)}$$

6) Calculate the relative closeness to the ideal solution. The degree to which the alternative Ai is similar to A* is defined as follows:

$$RC_i^* = \frac{S_i^-}{S_i^* + S_i^-}, i = 1,2, \ldots, m \quad \text{Equation (8)}$$

7) Rank the preference order.

The last step is to rank the critical failure factors to determine the most significant one in affecting ERP implementation. Further explanation about the TOPSIS method can be seen in (Assari et al. 2012). In this study, the factors causing implementation failure were ranked from the most significant to the least.

Result and Discussion

The data collected from the respondents is shown in Table 1. For each factor, the table shows the number of respondents who filled in each option. For example, for the first factor, 12 respondents filled in "irrelevant", 17 respondents filled in "less relevant", 28 respondents filled in "quite relevant", 3 respondents filled in "more relevant", and 2 respondents filled in "very relevant". In total, there are 62 responses for each factor. Data collected from the questionnaire was processed using the TOPSIS method according to the steps described in the previous section to identify the most significant factors. Table 2 shows the weight value calculation method of TOPSIS after calculation in step 1. The results of the decision matrix showed that the total value was 1, which meant the value of the questionnaire parameters was appropriate. The derived weight value was used to prioritize the critical failure factors.

Table 1. Respondent responses from the questionnaire

Factor No.	Irrelevant	Less Relevant	Quite Relevant	More Relevant	Very Relevant
1	12	17	28	3	2
2	13	32	11	2	4
3	6	17	22	11	6
4	16	30	11	3	2
5	4	22	26	6	2
6	32	20	7	2	1
7	26	23	6	5	2
8	30	24	4	3	1
9	13	21	26	1	1
10	38	16	3	3	2
11	10	12	36	3	1
12	6	10	28	12	6
13	12	26	16	6	2
14	37	20	2	1	2
15	20	16	18	6	2
16	4	4	12	22	20
17	14	12	26	8	2
18	20	18	9	8	7
19	4	8	20	18	12
20	2	7	22	21	10
21	11	16	18	10	7
22	25	23	10	3	1
23	19	20	10	8	5
24	25	10	8	11	8
25	20	16	18	5	3
26	16	12	30	3	1
27	6	22	20	8	6
28	13	11	10	16	12
29	6	4	14	13	25
30	29	22	9	1	1
31	1	1	3	6	51
32	2	2	6	4	48
33	2	4	6	12	38
34	2	2	3	15	40
35	1	1	8	18	34

Table 2. Weight Value Matrix

Matrix	Weight Value
W1,1	0.223551917
W2,2	0.215036254
W3,3	0.214898867
W4,4	0.124163438
W5,5	0.222349524
SUM	1

The original data matrix must be normalized using the formula in the second step of the TOPSIS approach, and the result is shown in Table 3.

Table 3. Normalized decision matrix from the questionnaire

Factor No.	Irrelevant	Less Relevant	Quite Relevant	More Relevant	Very Relevant
1	0.1144	0.1685	0.2777	0.0515	0.0192
2	0.1240	0.3172	0.1091	0.0343	0.0383
3	0.0572	0.1685	0.2182	0.1888	0.0575
4	0.1526	0.2974	0.1091	0.0515	0.0192
5	0.0381	0.2181	0.2579	0.1030	0.0192
6	0.3051	0.1983	0.0694	0.0343	0.0096
7	0.2479	0.2280	0.0595	0.0858	0.0192
8	0.2861	0.2379	0.0397	0.0515	0.0096
9	0.1240	0.2082	0.2579	0.0172	0.0096
10	0.3623	0.1586	0.0298	0.0515	0.0192
11	0.0954	0.1190	0.3571	0.0515	0.0096
12	0.0572	0.0991	0.2777	0.2060	0.0575
13	0.1144	0.2577	0.1587	0.1030	0.0192
14	0.3528	0.1983	0.0198	0.0172	0.0192
15	0.1907	0.1586	0.1785	0.1030	0.0192
16	0.0381	0.0397	0.1190	0.3777	0.1917
17	0.1335	0.1190	0.2579	0.1373	0.0192
18	0.1907	0.1784	0.0893	0.1373	0.0671
19	0.0381	0.0793	0.1984	0.3090	0.1150
20	0.0191	0.0694	0.2182	0.3605	0.0959
21	0.1049	0.1586	0.1785	0.1717	0.0671
22	0.2384	0.2280	0.0992	0.0515	0.0096
23	0.1812	0.1983	0.0992	0.1373	0.0479
24	0.2384	0.0991	0.0794	0.1888	0.0767
25	0.1907	0.1586	0.1785	0.0858	0.0288
26	0.1526	0.1190	0.2976	0.0515	0.0096
27	0.0572	0.2181	0.1984	0.1373	0.0575
28	0.1240	0.1090	0.0992	0.2747	0.1150
29	0.0572	0.0397	0.1389	0.2232	0.2397
30	0.2765	0.2181	0.0893	0.0172	0.0096
31	0.0095	0.0099	0.0298	0.1030	0.4889
32	0.0191	0.0198	0.0595	0.0687	0.4602
33	0.0191	0.0397	0.0595	0.2060	0.3643
34	0.0191	0.0198	0.0298	0.2575	0.3835
35	0.0095	0.0099	0.0794	0.3090	0.3259

The weighted normalized matrix was then computed by multiplying each normalized matrix value in Table 3 by its weight. Table 2 displays the computed weight value. The weighted normalized decision matrix from the third step of the TOPSIS approach is shown in Table 4.

Table 4. Weighted normalized decision matrix

Factor No.	Irrelevant	Less Relevant	Quite Relevant	More Relevant	Very Relevant
1	0.3069	0.6160	1.6712	0.0192	0.0085
2	0.3602	2.1827	0.2579	0.0085	0.0341
3	0.0767	0.6160	1.0317	0.2579	0.0767
4	0.5457	1.9184	0.2579	0.0192	0.0085
5	0.0341	1.0317	1.4409	0.0767	0.0085
6	2.1827	0.8526	0.1044	0.0085	0.0021
7	1.4409	1.1276	0.0767	0.0533	0.0085
8	1.9184	1.2278	0.0341	0.0192	0.0021
9	0.3602	0.9400	1.4409	0.0021	0.0021
10	3.0780	0.5457	0.0192	0.0192	0.0085
11	0.2132	0.3069	2.7625	0.0192	0.0021
12	0.0767	0.2132	1.6712	0.3069	0.0767
13	0.3069	1.4409	0.5457	0.0767	0.0085
14	2.9181	0.8526	0.0085	0.0021	0.0085
15	0.8526	0.5457	0.6906	0.0767	0.0085
16	0.0341	0.0341	0.3069	1.0317	0.8526
17	0.4178	0.3069	1.4409	0.1364	0.0085
18	0.8526	0.6906	0.1727	0.1364	0.1044
19	0.0341	0.1364	0.8526	0.6906	0.3069
20	0.0085	0.1044	1.0317	0.9400	0.2132
21	0.2579	0.5457	0.6906	0.2132	0.1044
22	1.3322	1.1276	0.2132	0.0192	0.0021
23	0.7695	0.8526	0.2132	0.1364	0.0533
24	1.3322	0.2132	0.1364	0.2579	0.1364
25	0.8526	0.5457	0.6906	0.0533	0.0192
26	0.5457	0.3069	1.9184	0.0192	0.0021
27	0.0767	1.0317	0.8526	0.1364	0.0767
28	0.3602	0.2579	0.2132	0.5457	0.3069
29	0.0767	0.0341	0.4178	0.3602	1.3322
30	1.7927	1.0317	0.1727	0.0021	0.0021
31	0.0021	0.0021	0.0192	0.0767	5.5442
32	0.0085	0.0085	0.0767	0.0341	4.9112
33	0.0085	0.0341	0.0767	0.3069	3.0780
34	0.0085	0.0085	0.0192	0.4796	3.4105
35	0.0021	0.0021	0.1364	0.6906	2.4641

Table 5 discovers the max and min values or the positive ideal (A*) and negative ideal (A–) solutions of each column in Table 5. Using step 6 of the TOPSIS technique, we estimated relative closeness to the ideal solution after obtaining the value of the separation measure. Then, we assigned a ranking to each significant failure factor for ERP system adoption. Table 6 shows the final ranking of the critical failure factors.

Table 5. Max and min value of weighted normalized decision matrix

Positive ideal (A*) and Negative ideal (A–)					
Max	3.0780	2.1827	2.7625	1.0317	5.5442
Min	0.0021	0.0021	0.0085	0.0021	0.00213

Table 6. Final ranking of the critical failure factors of ERP Implementation

Sort Cli	**Ranked by weight**	**Factor No.**
0.538002031	1	31
0.507182149	2	32
0.40054027	3	34
0.369395481	4	33
0.325554611	5	10
0.321526792	6	14
0.315932359	7	35
0.296517565	8	11
0.266908224	9	6
0.261115054	10	8
0.248853074	11	2
0.243446646	12	30
0.235823937	13	26
0.231475637	14	4
0.218845144	15	7
0.215244776	16	1
0.212247225	17	22
0.211646943	18	9
0.210450992	19	5
0.203732146	20	12
0.190688324	21	29
0.189930982	22	13
0.187621187	23	17
0.1745432	24	16
0.173183596	25	20
0.173099768	26	24
0.16723434	27	27
0.156186199	28	15
0.15617675	29	25
0.154471463	30	3
0.14941795	31	23
0.145695239	32	19
0.143988089	33	18
0.122531939	34	21
0.105076908	35	28

Table 7. Six of the most important critical failure factors in ERP

No. of Factors	Critical Failure Factors	Relative closeness (RCi*)	Rank
31	Lack of understanding of the organization's business processes	0.53800	1
32	Bad business process reengineering	0.50718	2
34	High complexity of the system	0.40054	3
33	Too much system customization	0.36940	4
10	Vendors conflict	0.32555	5
14	Cost overruns	0.32153	6

Table 7 provides the first six final rankings of the 35 important failure criteria for ERP system adoption based on 62 firm respondents. The most significant factors influencing ERP implementation failure are (31) lack of understanding of the organization's business processes, (32) bad business process reengineering, (34) high complexity of the system, (33) too much system customization, (10) conflicts between organization and vendors and (14) project cost overruns.

The first factor that most influences the failure of ERP implementation in Company XYZ is a lack of understanding of the organization's business processes. Understanding a company's business processes is the most important thing in designing a system, especially an ERP system because these business processes will be implemented into the system (Alshamrani and Bahattab 2015). In the requirements analysis phase, business analysts should be able to get detailed requirements and confirm back to the user until the testing phase (Kramer 2018). This finding contradicts (Amid et al. 2012) who revealed that a lack of understanding company's business process is not found in the first 31 rankings of 47 Critical Failure Factors of ERP implementation in Iranian Industries.

The second most influential factor is bad business process reengineering. ERP has business process best practices that companies can implement in terms of production, maintenance, logistics, accounting, etc (Jamil and Qayyum 2019; Yadav et al. 2020). Thus, in ERP implementation, appropriate business process reengineering must be carried out, either following ERP best practices or following the company's business processes by customizing programs (Ghayas et al. 2022). This finding aligns with (Yadav et al. 2020) who found that poor business process reengineering is very influential on the failure of ERP implementation and is ranked in the top ten.

The third most influential is the high complexity of the system. XYZ company has a wide range of business complexities with several different business lines, so the ERP system implemented is also quite complex with various business scenarios. Complex systems must be balanced with the ability of the operating user (Matende and Ogao 2013). This finding aligns with (Amid et al. 2012) who found that most of the project managers in Iranian Industries mentioned high system complexity as the sixth leading cause of ERP implementation failure.

Furthermore, the fourth most influential factor in the failure of ERP implementation at Company XYZ is too much system customization. Too much customization in the ERP system can cause bugs that make it difficult for users and generate incorrect reports (Ali and Miller 2017). According to several studies, a good ERP system that runs smoothly is a system that doesn't do a lot of customization and follows the best practices of the system (Amid et al. 2012; Yadav et al. 2020; Prasetyo et al. 2019; Xue et al. 2005). This finding aligns with (Huang et al. 2019) who found that minimum customization or avoiding customizations indicates the success of an organization in implementing an ERP system.

Then the fifth most influential factor of ERP implementation failure at Company XYZ is vendors' conflict. The vendor chosen when implementing ERP is very important because the vendor brings in resources, products, and knowledge of the customer's business processes (Elragal and Haddara 2013). Vendor assessment before the project is carried out can help vendor selection, it is better if the vendor has already implemented the program in several similar businesses (Prasetyo et al. 2019). This finding aligns with (Chakravorty et al. 2016) who found that failure of the company's ERP implementation can result from a mistake in vendor selection.

The sixth most influential factor is the cost overrun. Good project planning should describe in detail all project components including costs that will occur in the future (Jaeger et al. 2020). Likewise, project boundaries must also be defined so that the project can be executed, the project objectives are achieved, and no cost overrun occurs (Amid et al. 2012; Ghayas et al. 2022). This finding contradicts (Huang et al. 2019) who revealed that cost overrun does not have an impact on the failure of ERP implementation, but it is a failure of the project manager in project management.

Other factors are also quite influential in the failure of ERP implementation in Company XYZ, but improvements will be made to the top six factors first to be able to overcome implementation failures in the next phase. By identifying the critical factors that affect ERP implementation failure at Company XYZ, several recommendations can be suggested for companies who want to (re-)implement ERP. To avoid repeated failures in the future, companies can conduct a deeper analysis of the existing business processes and processing business units to determine more appropriate business process reengineering for ERP implementation. The involvement of consultants and implementing teams in conducting in-depth analysis is also needed to better understand what users need (Prasetyo et al. 2019). In this case, the business processes and processing business unit have complex processes so in the previous implementation there was a lot of customization on the SAP application, which caused the use of the ERP system to be less than optimal. In the future, after an in-depth analysis, it is necessary to design an ERP system that is more in line with current business processes and can reduce system complexity. From the factors in the project management category, there were conflicts during ERP implementation and cost overruns. In the subsequent implementation, the project manager's role is needed to avoid these things.

In mining sector companies that have many business units, it is essential to pay attention to the factors that cause ERP implementation failure. Lack of process vision and deployment process in ERP business process can be a major factor of implementation failure. Thus, for ERP implementation in companies that have many business units, it is better to have subject matter experts who know the company's overall business processes and understand how business processes in ERP can be carried out so that business process reengineering can be carried out accordingly.

Conclusion

In this work, critical failure factors of ERP implementation in Company XYZ were identified using a survey and then processed with the TOPSIS method. These factors are categorized into several types, and the results of this study indicate that the process, technical, and project management categories are the main causes of the failure of ERP implementation in Company XYZ. The first factor that most influences the failure of ERP implementation in Company XYZ is a lack of understanding of the organization's business processes, followed by bad business process reengineering in second place, high complexity of the system in third place, too much system customization in fourth place, then vendors conflict in fifth place, and lastly in sixth place is cost overrun. It can also be seen that implementation failure can occur in only one of the company's business units. Even though the same consultant, vendor, implementation time, top management, and implementation team are used, implementation failures can still occur.

This research makes four contributions, 1) it provides in-depth insight into critical failure factors of ERP implementation in multi-business area companies, 2) it illustrates how a TOPSIS methodology is used to rank critical failure factors of ERP implementation, 3) it makes recommendations to the company who wants to implement ERP system to concern in failure factors that often cause implementation failure, and 4) it provides an extended model for company who wants to evaluate critical failure factors of ERP Implementation.

This research is limited to evaluating implementation failures that occurred in one mining company, in the future it can be developed to evaluate system implementation failures in many mining companies in Indonesia. Further research also can continue how ERP implementation is carried out in companies that have many business units with different lines, what methods should be used, and what tips need to be implemented. The ranking method used is TOPSIS because it is relatively easy and accurate to use.

Respondents are currently still in the internal company, in the future, it can be developed for external companies such as vendors, consultants, and auditors.

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Appendix

Critical Failure Factors (Amid et al. 2012)

Categories	No.	Factor Name	Factor Description
Organizational (OR)	1	Government organization structure	Rigid and highly hierarchical organization structure of government
	2	Internal conflicts	There is an internal conflict of interest over the implementation of the ERP system
	3	Inflexible company	Organizations have difficulty adjusting to changing business processes
	4	Rigid company culture	The organizational culture is very rigid and difficult to accept new conditions
	5	Misfit of ERP system to company's structure	ERP system incompatibility with organizational structure
	6	Wrong design business strategies	The definition of business strategy is not fit so the objectives of ERP implementation are not on target
	7	Poor strategic objectives	Organizational strategic goals that are not good among employees
	8	Unstable managerial positions	Changes in managerial positions are quite fast and massive
Project Management (PM)	9	Consultants conflict	There was conflict between consultants during the implementation phase
	10	Vendors conflict	There was a conflict with the vendor/ ERP product during the implementation phase
	11	Lack of project team	Inexperienced ERP implementation project team
	12	Bad project management	Poor project management during implementation
	13	Bad risk management	Poor risk management during implementation
	14	Cost overruns	The project cost exceeds the specified budget
	15	Timeline delays	The implementation timeline does not follow the planning
	16	Lack of project boundaries	Project boundaries are not well-defined
Human Resources (HR)	17	Rigid employee's mindset	Employees' minds are not flexible so they cannot accept changes in business processes
	18	Lack of training and knowledge transfer	Lack of training and knowledge transfer sessions between employees
	19	Lack of employee involvement	Lack of training and knowledge transfer sessions during the implementation and transfer of employee positions
	20	Poor communication	Lack of clear communication regarding understanding of the ERP system
	21	Poor change management	Lack of change management strategy during the transition to business process changes using the ERP system

Categories	No.	Factor Name	Factor Description
	22	Lack of employee motivation	Lack of employee motivation to play an active role in supporting ERP implementation
	23	Incompetence key users	Lack of competency of key users, so the process of knowledge transfer to end users is not effective
	24	Baseless expectations	User expectations are too high for the ERP system
Managerial (MG)	25	ERP readiness assessment missed	An ERP readiness assessment is not carried out before implementation
	26	No performance measurement system	Project Manager does not run a performance measurement system
	27	No long-term planning	There is no long-term plan for the function of the ERP system
	28	Lack of top managerial support	Lack of support from top management for all activities related to the ERP system
Vendor and Consultant (VC)	29	Incompetence Consultant	ERP implementor consultants are less competent/experienced
	30	Unprofessional vendors	
Processes (PR)	31	Lack of understanding of the organization's business processes	Vendors/ ERP products are less professional and experienced
	32	Bad business process reengineering	Business process reengineering does not align with best practice ERP processes
Technical (TC)	33	Too much system customization	Too many program customizations have caused a lot of bugs in the system
	34	The high complexity of the system	High complexity of the system because it forces to follow the company's business processes
	35	Inaccurate data	The data entered into the system is inaccurate resulting in incorrect reports

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