

The Readiness of Palm Oil Industry in Enterprise Resource Planning

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Abstract

The palm oil industry is one of the sources of non-oil and gas foreign exchange of Indonesia. It contributes to National Gross Domestic Product at 13.96% in 2017. This study aims to examine the readiness of palm oil industry in the implementation of Enterprise Resources Planning (ERP). The readiness of palm oil industry in implementing ERP, is not only about a large cost, but also the ERP has required great resources including human resources, technology, management, and process and data. Thus, it should fit the needs of the industry. Using the Critical Success Factors (CSF) method, this study employs five dimensions of the ERP readiness, that is management, process, technology, data, and personnel. A survey research method is employed to acquire the data and there are 19 items for those five dimensions. A gap analysis is employed to analyse the data and this method is used to determine the disparity between existing conditions and future expectations. The findings reveal that the palm oil industry is well prepared to implement the ERP from four dimensions of management, technology, process and personnel. The management factor is the one of an factor of readiness in the ready category together with other factors including process, and human resources. Technology is the best factor which has led to increasing demands for building a strong information technology infrastructure to integrate business processes. The company needs to complete the master data onto the database and change the database system integrated into a single database that causes data is lack of ready data in ERP implementation.

Keywords: critical success factor, ERP, palm oil, readiness

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1. Introduction

Nowadays, the development of technology in the company is growing rapidly. An information is a crucial factor in supporting the decision making process. This information utilization is not only served as supporting tools to improve performance in managing business processes, but it is served as the main tools to win a competitive competition. Several ways are taken by companies to improve competitive position in the market place, and developing an information technology (IT) is one of those ways. An integrated IT can serve as a mean in managing a business DM. One of the developments of the enterprise information systems supported by the tools is enterprise resource planning (ERP). The use of IT strategically will enable the company to increase profitability, which is one of the performance indicators [1-3].

The ERP is a corporate transaction framework and a system that is dedicated to integrating and automating many internal processes of handling manufacturing, logistics and distribution as well as corporate accounting, finance and human resources processes [4, 5]. The ERP system is expected to support the data flow thus information can be smoothly delivered. In the end, it will improve the effectiveness and the efficiency of work. Many companies around the world including Indonesia are currently attempting to convert their systems to the ERP systems for both manufactured firms and the service sector firms [6].

The palm oil industry is one of the main industries in Indonesia that has implemented the ERP in their business activities. The industry has made a significant contribution to the Indonesian economy, exemplified by its contribution to National Gross Domestic Product at 13,96% in 2017 [7]. The bright prospect of palm oil commodities in the world vegetable oil trade has prompted the government to spur the development of oil palm plantations. The following is a map of the area of oil palm industry in Indonesia [7]. Table 1 shows the number of exports (in Rupiah)

generated by the palm oil industry in 2011-2015 to several destination countries such as China, Singapore, Malaysia, India and others.

Table 1. Value of Palm Oil Exports [7]

No	Ekspor Value	2011	2012	2013	2014	2015
1	Net Weight (Thousand Tonnes)	16.436,2	18.845,0	20.578,0	22.892,4	26.467,6
2	FOB Value (Million US \$)	17.261,2	17.602,2	15.838,9	17.464,9	15.385,3

There are a number of studies has been conducted to evaluate the readiness of the ERP implementation from various perspectives such as Abdinnour-Helm, et al. [8] investigated the readiness of human resources in ERP implementation. Abdolvand, et al. [9] conducted an assessment on the readiness indicators that are determined based on the critical success and failure factors including egalitarian leadership, collaborative working environment, top management commitment, supportive management, and use of information technology. Raymond, et al. [10] conducted an analysis to develop the concept of ERP implementation in smal-medium sized enterprises through four dimensions including the organizational context, external forces, and perception of ERP and business processes. Ahmadi, et al. [11] developed a novel approach to assess readiness model for managing the interrelation degree among activities within organizations. Ram, et al. [12] examined the organizational readiness is associated with four critical success factors including project management, business process re-engineering, training and education and system integration, to achieve effective ERP implementation in organizations.

Although a few of these studies attempted to assess the readiness of organizations in implementation of ERP, they are mainly descriptive surveys. They are based on limited cases of human resources, leadership, management supports and business processes. There is thus a lack and provide empirical evidence based on organization resources including management, process, technology, data and human resources using gap analysis.

Moreover, the majority of the above studies are predominantly based on the readiness of general organizations in implementing ERP. There remains little research on readiness of palm oil organizations or companies. Importantly, the readiness of palm oil companies can be more complex than other organizations due to the absensce of management, process, technology, data and human resources.

Thus, this research aims to examine the ERP implementation readiness using quantitative research method, the critical success factors (CSF) and a gap analysis. Quantitative method is used to obtain data through survey using closed-ended questionnaire that is developed from prior studies. The aggregated CSFs are classified into five groups that is management, processes, technology, data and human resources. Assessing these factors measures the readiness of ERP Implementation. This research investigated the readiness through conducting a survey in four companies in the sector of the palm oil industry within the scope of Banyuasin regency and Musi Banyuasin regency of South Sumatra province, Indonesia.

This research consists of sections namely: the first section is Introduction. This section is expected to be a global picture of the contents of this research. The second section contains the literature review, covering various studies that serve as the basis of strengthening and reinforcing the points of idea of strategic-planning. The third section is research methodology, describing the research methods. It includes research designs, population and samples, research instruments, data collection techniques and data analysis techniques. Fourth section is a discussion of research results consisting of: analyzing and reviewing readiness of the company. Fifth section is the final or concluding part of this study containing the conclusions of the research results as an affirmation of the answers to the research problems.

2. Research Method

Quantitative research method is used in this research. Bryman and Bell [13] and Sekaran and Bougie [14] described that quantitative method is a research method that employed data in the form of numbers and statistical analysis. Quantitative method is used, when the problems deviate from expected results and the facts, between planning and proceeding, between theory

and practice, between plan and implementation. Data is obtained through survey using closed-ended questionnaire that is developed from prior studies summerized in Table 2. It consists of five factors including management, process, technology, data and human resources.

Table 2. ERP Implementation Factors

No	Researchers	Titles	Fields	Implementation Factors ERP						
				Management	Proces	Technology	Data	Personel	Goals and Value	Other sources
1	Tasevska, et al. [15]	Implementation of Project Risk Evaluation of ERP System in Small and Medium Enterprises	SMEs Manufacture	√	√	√	√			
2	Wijaya and Sumiyana [16]	Analysis of Critical success Factors (CSF) in ERP Implementation: Case Study PT. Telekomunikasi Selular Regional Jateng & DIY	Telecommu- nication	√		√	√			
3	Wicaksono, et al. [17]	Impact Analysis of Implementation of ERP System on User Performance	Manufacture			√	√	√		
4	Falgenti, et al. [18]	The design of production modules of ERP systems based on requirements engineering for Electronic Manufacturing Services company	SMEs	√	√	√	√	√	√	√
5	Almajali, et al. [19]	Antecedents of ERP systems implementation success: a study on Jordanian healthcare sector	Healthcare sector				√			
6	Shatat [20]	Critical Success Factors in Enterprise Resource Planning (ERP) System Implementation: An Exploratory Study in Oman	General Organisation	√	√	√		√	√	√
7	Fui-Hoon Nah, et al. [21]	Critical factors of successful implementation of enterprise systems	Literature Review	√	√	√			√	√

2.1. Sample Selection

An analysis is divided into operational, sales and marketing, and human resources. Business processes analysed the business process of sales, purchasing, employee recruitment, and payroll. In the implementation of ERP system, there are 32 respondents, and the respondents are the palm oil industry's employees. The respondents covered a manager, eight assistant managers, eight supervisors, and 15 staff / employees from four companies located in Banyuasin and Musi Banyuasin Regency.

The sample is calculated using a formula According to Sarwono [22], the sample formula for simple random sampling technique is as follows.

$$n = \frac{N}{N(d)^2 + 1} = \frac{32}{32(0.05)^2 + 1} = 29.36$$

where

N = total populations

D = degree of freedom.

The total sample representing the population used in this study is 30 respondents.

2.2. Measurement Scale

To determine the length of the interval, this study used a five point Likert-type scale where the value "1" represents "Strongly Disagree (SA)", value "2" represent "Agree (A)", value "3" represent "Moderate (M)", value "4" represent "Disagree (D) and value "5" represent "Strongly agree", and then the measuring instrument is utilized to produce quantitative data and

then it is analyzed using gap analysis between the current system readiness conditions with following business process.

To ensure all the data obtained can be processed properly, this research made some adjustments in each variable scale from the Likert Scale to the interval scale. It is necessary for further analysis, mathematical calculations such as multiplication and division operations is employed to each variable to obtain its mean value. Based on the result of mathematic calculation, Table 3 shows that there are 5 categories to measure the readiness of palm oil industry in ERP use. The instruments is started from 0 to 0.8 indicating 'Highly Ready', 0.9 to 1.6 indicating 'Ready', 1.7 to 2.4 indicating 'Moderately Ready', 2.5 to 3.2 indicating 'Not Ready' and 3.3 to 4 indicating 'Not ready at all'.

$$\text{Scale Range} = \frac{\text{High scores} - \text{lowest score}}{\text{Assessment criteria}} = \frac{(4-0)}{5} = 0,80$$

note:

Table 3. Readiness Categorization

No	Scales	Categories
1	0 - 0,8	Highly Ready
2	0,7 – 1,6	Ready
3	1,7 – 2,4	Moderately Ready
4	2,5 – 3,2	Not Ready
5	3,3 - 4	Not ready at all

3. Results and Analysis

It can be seen in Table 4 that number of male respondents are higher than female respondents. Based on observation, it requires more physical activities and most of the work fields usually done more occupied by men than women.

Table 4. Respondents Profile

No	Items	Characteristics	Total Respondents	Percentage
1	Genders	Male	18	60%
		Female	12	40%
		Total	30	100%
2	Age	21-30	5	16,6%
		31-40	10	33,3%
		41-50	12	40%
		>50	3	10%
		Total	30	100%
3	Education	Senior High School	4	13,3%
		Diploma	6	20%
		Bachelor	17	56,6%
		Magister	3	10%
		Total	30	100%

Based on the age perspective, respondents are mostly from 41-50 years old. In terms of the level of education, most of respondent from bachelor degree. It can be understand, the company relies on the knowledge of employees in order to provide ideas and innovation.

3.1. Gap Analysis

The investigation data of the readiness of the palm oil industry is obtained from questionnaires with 38 items from 30 respondents. The highest score obtained is five and the lowest score is one. The data is analyzed using SPSS v.21. Therefore, it can show the mean score of each indicator for five dimensions. The frequency distribution is presented in Table 5.

The mean score of each indicator for five dimensions is obtained by dividing the number of score achieved and the number of assessment criteria. It shows the score of readiness in accordance with the categorization of readiness.

Table 5. Distribution of Current Readiness

		Score					Total	Mean
		1	2	3	4	5		
Management	Commitment	0	12	3	3	0	86	2,87
	Education	0	12	6	0	0	77	2,57
	Involment	0	13	5	0	0	73	2,43
	Training	0	5	9	4	0	92	3,07
	Role & Responsibilities	2	10	7	0	0	75	2,5
Process	Alignment	1	10	8	0	0	76	2,53
	Documentation	0	12	6	0	0	76	2,53
	Integration	4	5	9	0	1	74	2,47
	Process Redesign	4	9	4	1	1	67	2,23
Technology	Hardware	0	10	6	2	0	84	2,8
	Software	0	10	6	2	0	84	2,8
	System Management	1	5	11	2	0	89	2,97
Data	Master Files	9	5	4	0	0	61	2,03
	Transactional Files	8	9	1	0	1	56	1,87
	Data Structure	8	6	4	0	0	57	1,9
	Education	3	9	6	1	0	73	2,43
Personnel	Training	2	9	7	1	0	76	2,53
	Skills Development	3	10	5	1	0	71	2,37
	Knowledge Management	3	11	5	0	0	69	2,3

Table 6 shows the value gap that is obtained by fulfilling two conditions; current readiness score and predicted readiness. The value gap scores are derived from calculating the difference score of the current and the future score of the company readiness. This gap indicates the direction of improvement /development that is done by the minimum limit of improvement on current conditions. Therefore, the readiness gap is getting smaller after getting the value gap score of each aspect required. This research found five gaps of ERP implementation in Palm oil Industry. Table 6 shows the details of each dimension.

Table 6. Distribution of Predicted Readiness

		Score					Total	Mean
		1	2	3	4	5		
Management	Commitment	5	5	8	0	0	106	3,53
	Education	6	4	7	0	0	113	3,77
	Involment	6	10	2	0	0	120	4
	Training	0	10	7	0	0	102	3,4
	Role & Responsibilities	8	4	6	0	0	113	3,77
Process	Alignment	8	4	5	0	0	121	4,03
	Documentation	2	9	7	0	0	109	3,63
	Integration	6	5	6	0	0	112	3,73
	Process Redesign	4	7	7	0	0	111	3,7
Technology	Hardware	5	2	10	1	0	106	3,53
	Software	0	7	10	0	0	101	3,37
	System Management	2	6	10	0	0	107	3,57
Data	Master Files	9	7	2	0	0	127	4,23
	Transactional Files	6	9	3	0	0	125	4,17
	Data Structure	12	2	3	0	0	126	4,2
	Education	4	6	8	0	0	107	3,57
Personnel	Training	4	8	6	0	0	112	3,73
	Skills Development	3	9	6	0	0	110	3,67
	Knowledge Management	4	13	1	0	0	120	4

Based on Table 7, existing gaps are analyzed from the collected questionnaire from four sample companies of palm oil industry as described by the following analysis.

Table 7. ERP Implementation Value Analysis

Condition		Current Score	Predicted Score	GAP		Mean	Category
Management	Commitment	2,87	3,53	0,67	SA	1,01	Ready
	Education	2,57	3,77	1,2	A		
	Involment	2,43	4	1,57	A		
	Training	3,07	3,4	0,33	SA		
	Role & Responsibilities	2,5	3,77	1,27	A		
Process	Alignment	2,53	4,03	1,5	A	1,33	Ready
	Documentation	2,53	3,63	1,1	A		
	Integration	2,47	3,73	1,27	A		
	Process Redesign	2,23	3,7	1,47	A		
Technology	Hardware	2,8	3,53	0,73	SA	0,63	Highly Ready
	Software	2,8	3,37	0,57	SA		
	System Management	2,97	3,57	0,6	SA		
Data	Master Files	2,03	4,23	2,2	M	2,27	Moderately Ready
	Transactional Files	1,87	4,17	2,3	M		
	Data Structure	1,9	4,2	2,3	M		
	Education	2,43	3,57	1,13	A		
Personnel	Training	2,53	3,73	1,2	A	1,33	Ready
	Skills Development	2,37	3,67	1,3	A		
	Knowledge Management	2,3	4	1,7	M		

3.2. Partial Analysis

This analysis is aimed at directing to the comparison analysis in order to distinguish from the variables. The relationship between the two variables (dimensions and factors) is ignored, and it is analysed using each factor separately.

- 1) Management factor is derived from the influence of the internal seriousness of management to the successful implementation of ERP system. Five parameters meet requirement, it indicates that the existing company has been well enough in placing its management ranks to take control of ERP implementation. It means that the influence of the management of the company's success in the implementation of ERP is quite high by involvement a commitment and education.
- 2) Process factor is an internal factor occurred supporting the company's performance. Indicated by the numbers of 1.10 - 1.50, it means the process factor is running properly for the four parameters. It can be seen that the process factor occurs routinely. It must really be concerned. While, the process plays an important role in the success of the company.
- 3) Technologies in the ERP system, technological factors become a significant factor in implementation of ERP. It is identically with computerized systems. Technological factors obtained were 0.57 to 0.73, which means that the technological factors are already well-prepared for the industry. As a note, a technology is an absolute prerequisite.
- 4) Data is one of an important factor related to file or information in companies. Moreover, the flow of processes of the company in the implementation of ERP is intergrated into every department, with the existence of these data. Therefore, three parameters of these factors are in moderately ready category.
- 5) Personnel of the ERP system, in addition to technology, there is other factors that are very influential, namely the human factor. Humans are agents or active objects to obtain success in ERP implementation. From above results, it is obtained the value of human in three parameters. They met the overall factors. It shows that human resources is ready. In terms of skill, knowledge, and education, the company realized about the importance of human quality of a company.

3.3. Full Analysis

The full analysis is an analytical technique to determine the readiness of each dimension in accordance with the ratio of existing factors. All the factors become main parameters in each dimension then determine the average value according to the ratio. It is found that there are three dimensions with ready categories namely management, process, and personnel. Technology dimension is categorized as verily ready.

3.4. Gap Level on Management Aspect: Ready

Management is a factor derived from the influence of the internal seriousness of management towards the successful implementation of ERP system. From the analysis, findings are obtained value gap 1.01. It indicates that the existing companies have been good enough in putting the ranks of management to take control of ERP implementation within the company. Leaders must be considered as the central of mobilizing resources and resolving conflicts. This requirement must have been met before implementation, the details are as follows.

- 1) Commitment: Successful implementation of ERP requires strong leadership, commitment, and top management participation. The leadership of the palm oil industry has explicitly identified ERP as a top priority. Defining the issues is solved by using the ERP system and determining the scope of the project more specifically. In other words, there has been a commitment to all levels of management.
- 2) Involvement: all the factors are supposed to provide analyses and thoughts about the business process when corporate executives established an ERP team. Leaders are involved in setting goals, objectives, team selection and infrastructure planning support supporting the successful implementation of ERP systems. There has been a clear understanding of strategic goals. Technical support aims to ensure the success of short and long term of the systems.
- 3) Education: The company's commitment to change is high. The company creates a forum for sharing knowledge of systems, best practices, business circuits and ERP projects. It is necessary to the persons that are responsible for this project (key users), know and understand the business integration process of all parts and functions of the company.
- 4) Role & Responsibilities: Leaders are also supposed to supervise the preparation of internal teams, willing to ensure competent employees are involved (employees in their expertise), as well as a clear performance measurement focus for the success of ERP implementation. There has also been socialization and intensive communication between leaders and employees.

3.5. Gap Level on Process Aspect: Ready

A process is an internal factor occurred supporting the performance of the company both processes related to humans, machines, products, materials, and systems. The value gap showed at 1.33. It means that the process factor is ready. In assumptions of the design that before implementing the company's ERP system the company should have a business process that corresponds to best practice, therefore a review of all business processes is required. The realities found are as follows.

- 1) Alignment: To apply an ERP system, then, a company changes its business processes. The process of adjustment between business process engineering and employee needs in the palm oil industry done by expecting that integrating all business processes through the implementation of ERP. Employees provided with working groups on various functions in the companies to gather information and define needs
- 2) Integration: Business processes of each part have been integrated design among other. The construction of the ERP system adjusted to the type of business processes of each business function. So that, all information about departments can be accessed in real time. The purpose of the ERP system is to provide a single application that works in an integrated manner covering various divisions of the company, such as planning, marketing, manufacturing, sales, finance and purchasing, human resource. Therefore, the process and DM is more effectively and proceed efficiently.
- 3) Redesign Process: The process of analyzing and redesigning workflow and business processes is not only done by top management but also by selecting outside consultants who are prepared to assist the process of preparing ERP implementation. In this phase, business processes are possible to be re-engineered at a more detailed level and well-organized documentation. People - procedures need to be analyzing when all business process plans re-engineered was implementing.

3.6. Gap Level on Data Aspect: Less Ready

Data Factor is a factor associated with the file or data in the company, including past and present data. Therefore, the existence of these data processed a flow within the company in the implementation of ERP. It will be integrated with every department can be done fluently. This factor gets a value gap between 2.27. It means the flow and data documentation is not ready.

Data is required in ERP implementation process and what data needed by company management in order to facilitate in taking a decision. Indicators of ERP data management are master files, transactional files, and data structures. A database conversion strategy is essential when implementing ERP. Sufficient data mapped into the system according to the format of the ERP system to support the running of the transaction process on the ERP modules. The findings disclose that are as follows.

- 1) Master files: There is a requirement of a master file in ERP implementation that consists of a collection of data records that are permanent it contained a data that is always adapted to the circumstances. In addition, a database is required that allows every department of Palm oil company to store and retrieve information in real-time. Using a database systems allow information to be more reliable, accessible, and easy sharing. However, it is apparent that the use of a database in Palm oil companies is not integrated among departments and has not been converting into a single database. Therefore, the data required for the ERP implementation process is incomplete. The database model used prior to implementation does not match the implementation requirement.
- 2) Data Structure: in term of data structure, most of Palm oil companies have the lack of system ability to run on various operating systems and there is no the absence of standard data and information through uniformity of reporting. In other words, there is no functionality match the program from different vendors.
- 3) Transactional files: these are collections of transaction data records occurred that is used for updating the master files. The palm oil industry has been not yet implemented standard information systems, where all divisions use the information systems or applications in different ways of data access. In addition, there is no an integrated database that can be utilized in accessing data in real-time between divisions of conducting business processes that the flow of information has not been effective and efficient.

3.7. Level Gaps of Personnel: Ready

In the ERP system, besides technology factor mentioned above, the human resources is a significant factor to help and support company in managing business operations efficiently and effectively. Human resources are agents or dynamic objects employed by companies to achieve success in their business. CSF analysis result is 1.33 for value gap of human resources. Design requirements, small internal teams and qualified consultants are critical success factors of ERP implementation [23]. These factors have been met requirements of readiness in ERP implementation.

- 1) Knowledge Management: Knowledge is the capability of human resources to find out how a business process has to be done efficiently and effectively. Experience of human resource is an understanding of the circumstances on how business processes should work flexibility to address the issues. The human resources of the palm oil industry have knowledge and experiences to identify the main objective and scope of the ERP project, determining project managers and other team members. They also have built a small team headed by a financial manager to select the appropriate business partners. It is because qualified business partners will influence the decision in systems implementation selection.
- 2) Education: Basically, when the systems in the company have been redeveloped, there is new procedures and processes that must be compiled and applied to the entire business activities. Human resource is one of the assets of a company that is capable and responsible for each task and has the ability to build more productive company atmosphere. The company has embedded these values of capabilities for every employee in order to adapt and develop themselves in changing environment rapidly.
- 3) Training: This is quite difficult to do training for the human resources especially end-users to use the ERP system in a company. End-users have received training intensive as the system used. Education and training also have conducted to show the benefit when the ERP systems implemented. Human Resources do not only have to learn to utilize the interface of new systems but also have to learn new processes and procedures in their business activities. Training materials are delivered by the internal company that can properly explain the changes in business systems and procedures with the ERP system. Everyone in the company will use the same system. It means that all parties must have a broader knowledge of the business processes of the company, as well as the relationships between departments. From practice, the ability of users can be improving, as the basis for them to use ERP system.

4) After the analysis process above, the fact reveals that majority of the factors meet the assumptions and requirements of ERP implementation.

The following is a summary chart of gap analysis results in order to investigate the readiness of the palm oil industry. Figure 1 shows that there are several significant factors. Data structures, transactional files, and master files are the dimension of data onto the category less ready. They also for the 3 aspects included in the dimensions of the lower technology. Refer to the picture above, the following improvisation should be done on each dimension in order to be to balance.

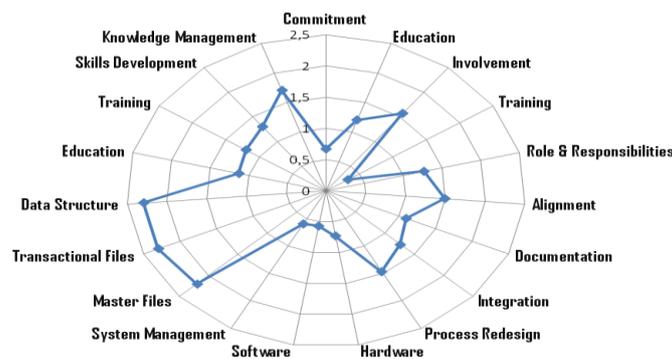


Figure 1. Readiness analysis of ERP implementation

3.8. Management Dimension

Top management should upgrade their knowledge of computer information systems and at the same time have to create and collaborate with experts and members of the Informatics System (IS)/IT team. Top management should define from the beginning a strategy that makes project leadership visible and effective. Support from top management and resource commitment is an important factor in ERP implementation. This current research findings are consistent with Tarhini, et al. [24] which indicates that the top management and commitment is the most important factor in ERP implementation in order to achieve best results, to get the required functionalities and to meet the expectations from ERP system

3.9. Process Dimension

In the ERP implementation, there are changes in the work process. Therefore, the company needs to make a good implementation planning that the implementation process can run according to the time specified. Communicating business strategy with IS / IT strategy is required to support more effective and efficient process business improvement. This finding appears to be consistent with prior study of IT strategic that found communication activities (e.g., IT and business relationship) to be a critical success factor in driving business process change and delivering valuable customized solutions [25]. Therefore, external consultant assistance is required to assist company in the preparation process of ERP implementation.

3.10. Technology Dimensions

To show the seriousness of top management in implementing ERP is budget preparation. Companies need to invest a lot of money to build a strong information technology infrastructure to integrate business processes into their respective branches, improve the hardware-software capability to ensure quality systems for running ERP as well as preparing post-implementation funds for the user account and license payments, yearly fees for Internet network. This current research findings agree with IT infrastructure studies that indicate the importance of empowering the integrated processes through IT infrastructure to help the internal activities and provide a competitive advantage [26] and to develop organizational capabilities to improve business performance [1].

3.11. Data Dimension

In term of data, it is likely that each application program writes its own data. Meanwhile, there is a possibility of the same data also found on other files used by other application programs.

In order to address the weakness of ERP systems for the processing system then the company needs to complete the master data onto the database and change the database system integrated into a single database. The ERP system has also made them accessible and online at the branch office that transaction processing and reporting can be done in real-time [27]. The existence of quality information generated by the system it will be useful for users of information on making decisions appropriately [28].

3.12. Human Resource Dimension

To train the ERP users using data and establish small implementation teams have a central role in implementation, the palm oil companies have to select a trusted consultant for training and support ERP users. Training provides a major role to determine the success or failure of ERP implementation and installation. All employees need be training how they connect to business process changes immediately. Probably, it is difficult for employees that are accustomed to working with existing procedures, but the change was done by giving training for the implementers and users. This findings are consistent with [19] that indicate the training is the greater influence on ERP implementation success.

Therefore, the users need to understand what to do as the ERP system run. In addition, training costs may be higher than expected. This is because of management purpose only, which is focused on the costs of teaching employees in using ERP systems and learning a new procedure in the budgeting process [29].

This current research findings are consistent with Tarhini, et al. [24] which indicates that the top management and commitment is the most important factor in ERP implementation in order to achieve best results, to get the required functionalities and to meet the expectations from ERP system.

4. Conclusion

The readiness factors of ERP implementation categorized into five groups: management, process, technology, data and human factors. These five factors should be the guidance of the palm oil industry to evaluate the readiness of implementation. Based on the results of the analyses, the management factor is the one of an aspect of readiness in the ready category together with other factors including process, and human resources. On the one hand, Technology is the best factor which has led to increasing demands for building a strong information technology infrastructure to integrate business processes. On the other hand, the company needs to complete the master data onto the database and change the database system integrated into a single database that causes data is lack of ready data in ERP implementation.

Furthermore, the company's leadership in the palm oil industry has made efforts minimizing the gap between each dimension. The company's leader has invested a lot of money to make improvements by building a strong network infrastructure, adding servers with high data processing capabilities and replacing the computer device in accordance with the needs of the system.

The efforts made by the company succeeded in minimizing the gap, especially in the dimensions of technology and process. The Leaders are also able to be role models in decision making, the active participation in top management in preparing trained human resources can motivate employees to improve their skills.

Future studus might focus on the identification of the readiness of palm oil industry from other perspectives including green IT and electronic supply chain management systems. While acknowledging the limitation of this study, the current study has nonetheless provided the readiness of palm oil industry that will present a useful foundation for future research.

References

- [1] D. Antoni. Critical Factors of Information Technology Infrastructure Quality for Enhancing Environmental Competencies of The Indonesian Organizations. *Jurnal Ilmiah Matrik*. 2015; 17(2): 133-150.
- [2] D. Antoni. Corporate Information Technology Infrastructure Factors in Palembang City (in Indonesia Faktor-Faktor Infrastruktur Teknologi Informasi Corporate di Kota Palembang). *Jurnal Sisfokom (Sistem Informasi dan Komputer)*. 2016; 5(1): 38-45.

- [3] N. Roztocki and H. R. Weistroffer. Evaluating information technology investments in developing economies using activity-based costing. *The Electronic Journal of Information Systems in Developing Countries*. 2004; 19(1): 1-6.
- [4] F. Carton and F. Adam. Towards a model for determining the scope of ICT integration in the enterprise: The case of Enterprise Resource Planning (ERP) systems. *Electronic Journal Information Systems Evaluation Volume*. 2010; 13(1):17-26.
- [5] S. M. Lee and S.-H. Lee. Success factors of open-source enterprise information systems development. *Industrial Management & Data Systems*. 2012; 112(7): 1065-1084.
- [6] E. Serova. Enterprise Information Systems of new Generation," in *European Conference on Information Management and Evaluation*. 2011: 452.
- [7] D. J. P. K. Pertanian, " Indonesian Plantation Oil Palm Statistics 2014-2016 (in Indonesia Statistik Perkebunan Indonesia Kelapa Sawit 2014-2016)", Direktorat Jenderal Perkebunan, Jakarta 2015.
- [8] S. Abdinnour-Helm, M. L. Lengnick-Hall, and C. A. Lengnick-Hall, "Pre-implementation attitudes and organizational readiness for implementing an enterprise resource planning system," *European journal of operational research*. 2003; 146: 258-273.
- [9] N. Abdolvand, A. Albadvi, and Z. Ferdowsi. Assessing readiness for business process reengineering. *Business Process Management Journal*. 2008; 14(4): 497-511.
- [10] L. Raymond, S. Rivard, and D. Jutras. Evaluating readiness for ERP adoption in manufacturing SMEs. *International Journal of Enterprise Information Systems (IJEIS)*. 2006; 2(4): 1-17.
- [11] S. Ahmadi, E. Papageorgiou, C.-H. Yeh, and R. Martin. Managing readiness-relevant activities for the organizational dimension of ERP implementation. *Computers in Industry*. 2015; 68(C): 89-104.
- [12] J. Ram, D. Corkindale, and M.-L. Wu. Examining the role of organizational readiness in ERP project delivery. *Journal of Computer Information Systems*. 2015; 55(2): 29-39.
- [13] A. Bryman and E. Bell. *Business research methods*. USA: Oxford University Press; 2007.
- [14] U. Sekaran and R. Bougie, *Research Methods for Business: A Skill Building Approach*: John Wiley & Sons, 2010.
- [15] F. Tasevska, T. Damij, and N. Damij. Project planning practices based on enterprise resource planning systems in small and medium enterprises-A case study from the Republic of Macedonia. *International Journal Of Project Management*. 2014; 32; 529-539.
- [16] M. R. A. Wijaya and D. Sumiyana, "Analysis of Critical success Factors (CSF) in ERP Implementation: Case Study PT. Telekomunikasi Selular Regional Jateng & DIY," Universitas Gadjah Mada, 2016.
- [17] A. Wicaksono, H. H. Mulyo, and I. E. Riantono. Impact Analysis of ERP System Implementation on User Performance (in Indonesia Analisis Dampak Penerapan Sistem ERP terhadap Kinerja Pengguna). *Binus Business Review*. 2015; 6(1): 25-34.
- [18] K. Falgenti, C. Mai, and S. M. Pahlevi. The design of production modules of ERP systems based on requirements engineering for Electronic Manufacturing Services company. in *Information Technology Systems and Innovation (ICITSI)*. Indonesia. 2015: 1-6.
- [19] D. A. Almajali, R. e. Masa'deh, and A. Tarhini. Antecedents of ERP systems implementation success: a study on Jordanian healthcare sector. *Journal of Enterprise Information Management*. 2016; 29: 549-565.
- [20] A. S. Shatat. Critical success factors in enterprise resource planning (ERP) system implementation: An exploratory study in Oman. *Electronic Journal of Information Systems Evaluation*. 2015; 18: 55-89.
- [21] F. Fui-Hoon Nah, J. Lee-Shang Lau, and J. Kuang. Critical factors for successful implementation of enterprise systems. *Business process management journal*. 2001; 7: 285-296.
- [22] J. Sarwono. *Research methods (in Indonesia Metode Penelitian)*. Kuantitatif Kualitatif, 2006.
- [23] M. Supramaniam and M. Kuppusamy. ERP system implementation: A Malaysian perspective. *Journal of Information Technology Management*. 2010; 21: 35-48.
- [24] A. Tarhini, H. Ammar, and T. Tarhini. Analysis of the critical success factors for enterprise resource planning implementation from stakeholders' perspective: A systematic review. *International Business Research*. 2015; 8: 25.
- [25] J. Luftman, K. Lyytinen, and T. ben Zvi. Enhancing the measurement of information technology (IT) business alignment and its influence on company performance. *Journal of Information Technology*. 2017; 32: 26-46.
- [26] D. Antoni, M. Akbar, and Janurita. Application Portfolio for Palm Oil Industries in Musi Banyuasin Regency (in Indonesia Portopolio Aplikasi Untuk Industri Kelapa Sawit di Kabupaten Musi Banyuasin). *Simetris: Jurnal Teknik Mesin, Elektro dan Ilmu Komputer*. 2017; 8: 693-700.
- [27] Y.-Y. Huang and R. B. Handfield. Measuring the benefits of ERP on supply management maturity model: a "big data" method. *International Journal of Operations & Production Management*. 2015; 35; 2-25.
- [28] M. Albashrawi and L. Motiwalla. *Adoption of Mobile ERP in Traditional-ERP Organizations: The Effect of Computer Self-Efficacy*. 2016.
- [29] H. Singleton. *Information Technology Auditing and Assurance*. Salemba Empat. 2007.