ERP Fit Evaluation – a Case Study of PT. Swarga Batu Indonesia

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Abstract

Business process of PT. Swarga Batu Indonesia (PT. SBI), a stone crusher company, consists of 4 main processes including purchasing, production, sales, and finance. The management anticipated the increasing needs of the company by implementing ERP PT. SBI as integrated system to support its smoothness of production and sales. The need for such systems was closely related to the integration of purchases, production, sales, and presentation of financial statements that can be used as business reference decissions. In the application of the system, there were constraints between ERP PT. SBI and its business processes that result in reports delay for the management because the system did not fit its business processes.

In this study, the author executed the research of fit evaluation on ERP PT. SBI that has already been running. The results also provided suggestions for the management of PT. SBI related to the implementation of ERP PT. SBI.

The research used qualitative approach and fit evaluation method to analyze the problem in the company. The result of the analysis summarized 2 main solutions, deviation identification and chart of account (COA) posting adjustment. Improvement in deviation function solution on ERP PT. SBI resulted in the addition of 3 specific fuctions of purchasing, materials (stock), and efficiency to validate losses in the operational activities. The position should be made in the journal on a special chart of account (COA) in the ERP to record losses and earnings in the production prosccesses to achieve fit in the system and its business processes.

Keywords: ERP, business process, fit evaluation

1. Introduction

PT. Swarga Batu Indonesia (PT SBI) is a Surabaya-based company that operates stone crusher plant located in Winongan Sub-District, Pasuruan District, East Java Province, Indonesia. PT. SBI produces materials for asphalt (hotmix) and concrete (ready mix) industries. Product specification of PT. SBI consists of fine aggregate (size <5 mm) and medium aggregate (size > 5 mm) produced from a stone crusher machine which follow the standard aggregate specification in the industry (Peraturan Beton Bertulang Indonesia, 1971). The demand of stone splits may vary, but PT. SBI applies 4 mm, 10 mm, 20 mm and 30 mm screens which produce 4 types of products ie. split 20-30 mm, 10-20 mm, 5-10 mm, and 0-5 mm.

The business process of PT. SBI consists of 4 main processes including Purchasing, Production, Sales, and Finance. PT. SBI orders raw materials, spare parts, and other operational tools from suppliers based on purchase orders approved by the management. The production team would record the production use of raw materials, production outputs, and other supporting goods in daily production activities. Production converts raw materials as stock of products that will be delivered to the customer according to the sales order. The administrative team have been responsible in documenting sales bill for the customer, receivable period of 1-2 months applies to the customers. The finance team is in charge of making payment transactions, recording accounts payable, and presenting detailed financial reports to the management.

PT. SBI has got geographycal advantage due to the government's infrastructure development program especially in East Java. One of the largest stone split supply today is Pasuruan - Probolinggo (Paspro)

highway road project measured for 38.3 km (Priyasidharta, 2017). Based on the reference, the estimated need for stone split materials reached more than 1 million cubic for the project and excluded split requirement for other construction work.

To meet the higher market demand in the area, PT SBI optimized its machinery and production equipment. The machine installed today is shanbao stone crusher machine series of 1 primary jaw crusher sized 600x900 and 2 secondary jaw crushers sized 250x1200 (Shanghai Jianshe Luqiao Machinery Co, Ltd, 2011). The management invested heavy equipment units of 1 Wheel Loader unit and 1 Excavator unit in the second quarter of 2017 to reach production capacity of 180.000 tons annually. PT. SBI would require considerable supply of raw materials from in average of 600 - 1000 tons daily or about 50 s.d 80 delivery using 8 cubic dump trucks (small DT). Stone split delivery from PT. SBI to the customers has reached 500 tons or 10 s.d 25 delivery using 20 cubic dump truck in average.

The management anticipated the increasing need to implement integrated system to support higher production and sales. The need for such information systems was closely linked to the integration of purchases, production, sales, and presentation of financial statements that can be used as a reliable financial reference in the business. PT. SBI had a vital need to record all transactions in a real time basis because one of the characteristics of the stone crusher business is the validity condition of raw materials and finished goods measurement in weighing scale (ton). The Company had a spesific requirement to record transactions of incoming raw materials or sales delivery materials based on its weighing stations.

In the third quarter of 2016, PT. SBI applied Enterprise Resources Plannning (ERP) by appointing one of the senior vendors to carry out ERP implementation. The vendor already developed ERP software products and experienced in ERP implementation for companies related to the industries of contractors, concrete business, and also similar companies. The management has engaged in a contract of desktop-based ERP implementation with the vendor. The management expected that the implementation of ERP PT. SBI would result in business process fit automation to support the business needs of the company.

The management gathered a team from purchasing, sales, production and finance divisions that work with the vendor for the ERP implementation. The team would be in charge during software installation, mentoring, transition process, and monitoring of ERP PT. SBI implementation. The implementation was not running as expected where the execution of the ERP, thera were constrains that posphoned the delivery results of ERP PT. SBI. There is a general understanding that adjusting the ERP system may lead to increased costs, time, resources, and complexity for future upgrades, but such adjustment is always a necessity and should be implemented (Hustad, Haddara, & Kalvenes, 2016).

The management recognized the importance of ERP in performing better operational performance for the company, especially in the integration of information and control processes. Therefore, the evaluation of software and business processes became one of the needs in overcoming the obstacles in the implementation of ERP PT. SBI. ERP has been transformed into a system that combines production planning, stock management, and business operational functions for manufacturing companies. Increased business competition makes the management of the company has an important need in controlling the total cost of the company. The advantages of using ERP include improvements in data access for decision making, operational quality improvement, and technological standardization (Stair & Reynolds, 2012). The ERP is also seen as a vehicle for modern companies to achieve business connectivity integration (Daneva, 2010). The importance of ERP PT. SBI as one of the existing components should get detailed attention from the management. Implementation of ERP in the company still runs as unsustainable projects. The use of ERP was not accompanied by continuous evaluations and improvements in automated business processes. This phenomenon shows that the use of ERP that should have an impact on the effectiveness of business processes has not been optimized (Garini & ER, 2017). The reference discusses the level of business process maturity while this research will aim to the fit evaluation of ERP PT. SBI and the company's business processes.

2. Methodology and Analysis

This study discussed the problem of conformity between ERP PT. SBI and its business processes using the design as in figure 2.1. As a qualitative research, this research performed data collection and data processing simultaneously as part of the discussion (Miles & Huberman, 2014).
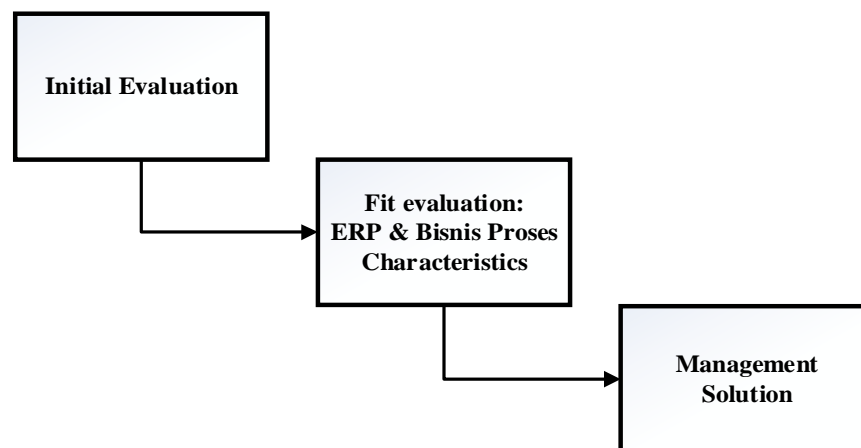
Figure 2. 1 Research Model

2.1 Research Methodology

This case study research used primary data as source of data collection. Primary data is obtained by the adjustment to the problems and disclosed in the study (Maholtra, 2004). In a qualitative approach, the primary data were obtained through two types of methods. The first method of interviews can be performed by interviews, focus groups, and projection techniques. The next method was observation that can be done on human aspect, process/mechanism, and technology. There were secondary data to support the research in the form of documents from companies such as work contract, Standard Operational Procedure (SOP), and other documents (Hair, Money, Samouel, & Page, 2007).

The author applied interviews between researchers and informants using open interviews using a list of questions that have been prepared previously (Basuki, 2010). The purpose of the interview is to obtain key person information within the company, related divisions of ERP PT. SBI, and business process description of PT. SBI. In addition to the primary data from the informants, the author also conducted secondary data collection related to ERP PT. SBI and its business processes, such as internal SOP documents, internal company regulations, and work contracts that support for the evaluation of ERP PT. SBI. Qualitative research as a complex picture is done by researching words, making detailed reports from the informant's point of view, and studying the natural situation (Noor, 2011).

2. 2 Implementation Background of ERP PT. SBI

Enterprise Resource Planning (ERP) is a set of multifunctional systems that are supported by a set of integrated software modules that support the basic functions of business processes within a company. ERP provides an integrated look at the core business processes of a company such as order processing, production, inventory management, and sales. The view aims to provide a tracking system for the use of enterprise resources such as raw materials, capital, and production capacity based on any information and data that has been inputted by any department within the company (O'Brien & Marakas, 2011).

ERP is a software for business management that includes modules supporting functional areas such as planning, production, sales, marketing, distribution, accounting, finance, human resources, project management, inventory management, services, and transportation. This software design supports the integration of transparent modules by providing the flow of information from all functions within a company consistently and transparently (Hossain, Rashid, & Patrick, 2002). ERP is designed to solve problems by integrating functional areas through the database (Turban, Rainer, & Potter, 2006).

ERP is the company's main software in terms of information coordination in every business area. ERP can manage the entire enterprise business process through databases and management reporting tools. ERP supports efficient business process operations by integrating all business tasks related to sales, marketing, manufacturing, logistics, accounting, and staff (Monk & Wagner, 2013). ERP is a management system to manage all information from each business area and integrate all modules so as to deliver consistent and transparent results and processes.

Implementation of ERP PT. SBI began in the third quarter of 2016. Line managers of each division and vendor were involved in the implementation. The company's management has ensured the readiness of IT infrastructure such as computer equipment, laptops, and network at head office (HO) and plant area (base camp) for ERP PT. SBI installation. The team from the company's line managers and vendor then performed the training process in assisting all staffs associated with the system, especially the HO officers and the basecamp officers associated with the company's administration and managerial tasks. All staffs associated with the system has become the user and received user ID to log in to the system. In this implementation, line managers and vendor conducted periodic reviews to ensure data input is working properly.

ERP PT. SBI operates on windows and mac operating system. In terms of security aspects, each user must use a password to log in the system. The system can process corporate transactions in a real time basis, connecting head office (HO) in Surabaya with the base camp in Pasuruan. As an online integrated system, ERP PT. SBI requires a stable Internet connection for transactions to run properly. PT. SBI uses Astinet service from PT. Telkom Indonesia to deliver a stable internet connection speed of 2 Mbps.
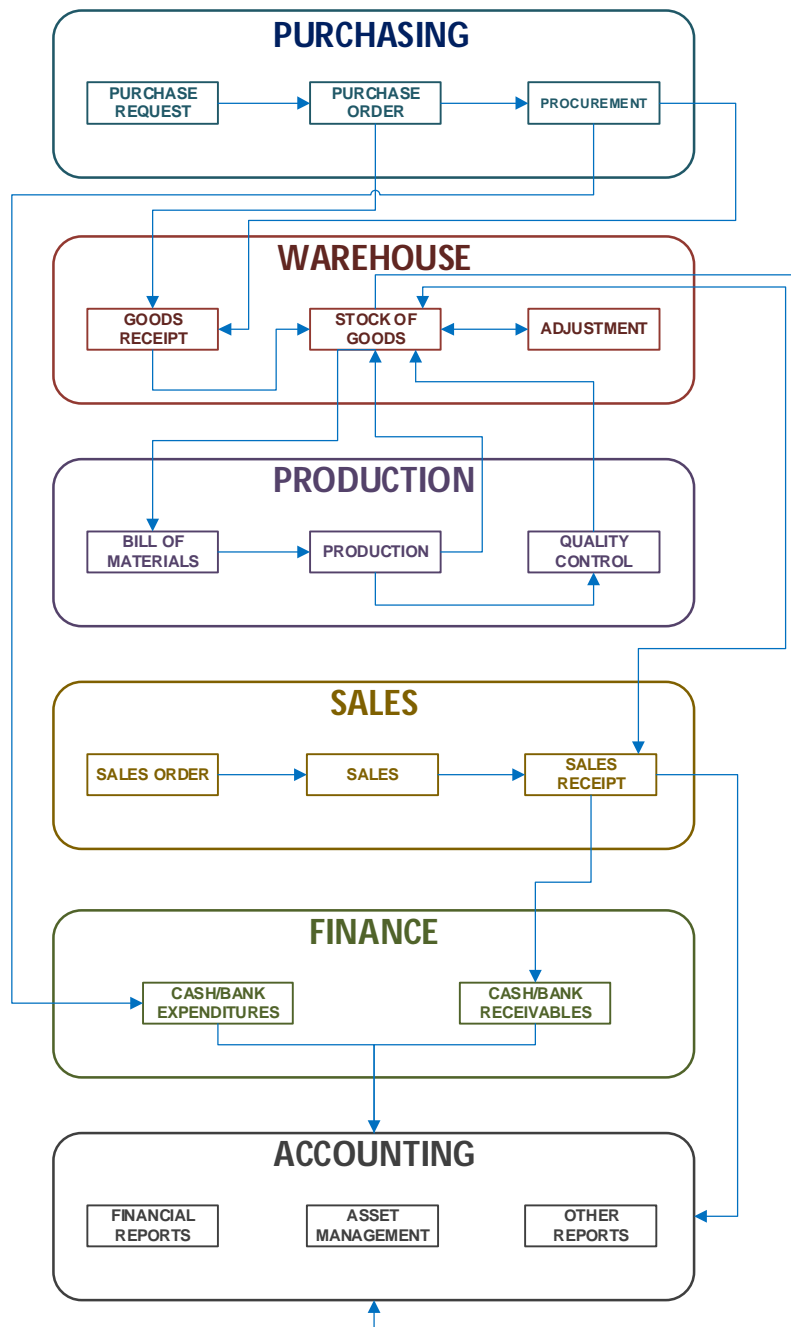
Figure 2. 2 Process Flow of ERP PT. SBI

ERP PT. SBI functions (figure 2.2) include purchasing, warehouse, sales, production, finance, and accounting. On the purchasing menu, there are other sub-menus that serve to perform purchase request transactions, purchase request approval, purchase order, and goods purchases. Warehouse menu has function to conduct goods receipt transaction, stock transaction, up to stock allocation arrangement of goods. Furthermore, for the production menu there are functions of material planning, production recording, up to quality control. On the sales side there is a sub-menu of sales order transactions, sales transactions, expedition, and invoice statement. The finance and accounting menu is included in the financial aspect, but is separated for transaction security needs. In stock listing, especially for warehouse and accounting related menu, the system uses FIFO configuration (first in first out). ERP PT. SBI has other menus to perform additional functions that are complementary, such as validation, approval, monitoring, and other general menus as part of the functions integrated in the system.

The management encountered obstacles in the implementation of ERP PT. The SBI. Based on references from previous research, the software can apply best practice but it does not mean it applies universally. An important characteristic of ERP is the software solution in a package but not a customized system solution. Thus, the ERP is built with built-in assumptions and procedures about the business processes of an organization (Luo & Strong, 2004).

2.3 Business Process of PT. SBI

The business process is a series of activities that produce goods and services that are beneficial to organizations, partners, and customers (Rainer & Cegielski, 2011). In a business, a process is defined as a collection of interrelated activities and tasks that convert inputs into outputs that include:

- Abeginning and an end
- Input and output.
- A set of tasks (sub-processes) that convert inputs into outputs.

This series of activities together embodies the business strategy. A business process is usually enforced within an organization, but can also interact with other business processes performed by other organizations (Weske, 2012).

PT. SBI head office (HO) business process consists of 4 processes including purchasing process, sales process, PPC (production planning & controlling) process, and finance process. The process in HO has become very important part of the company because of the centralization of decisions in its operational activities.

The business process in basecamp covered the processes that were the development of a series of ongoing activities in the factory area. The process included production, heavy equipment, quality control, warehouse, maintenance, and expedition. Business processes in this basecamp area were fully controlled by the head office to facilitate decision making and operational efficiency.

Other business processes of PT. SBI consists of semi-independent processes because they are not directly related to the core business of the company. These processes included human resource development, accounting, IT support, and legal. The semi-independent business processes provide transparency and objectivity benefits in conducting the company's business activities. The processes that exist in PT. SBI displayed complete picture of the overall business processes that exist in the company.

Business process model of PT. SBI has already been made with series of activites model and constraints between models of activities (Weske, 2012). Business process modeling of PT. SBI followed the description from BPMN (Business Process Modeling Notation), a methodology developed by Business Process Modeling Initiative (BPMI) in modeling business processes. The goal of BPMN is to provide a noteworthy notation to all business users and equally important is to ensure that the XML language designed for business process implementation can be expressed visually with common notation (Owen & Raj, 2003). Business process depiction of PT. SBI has added a special notation to describe events that occur in the organization as seen in figure 2.3.
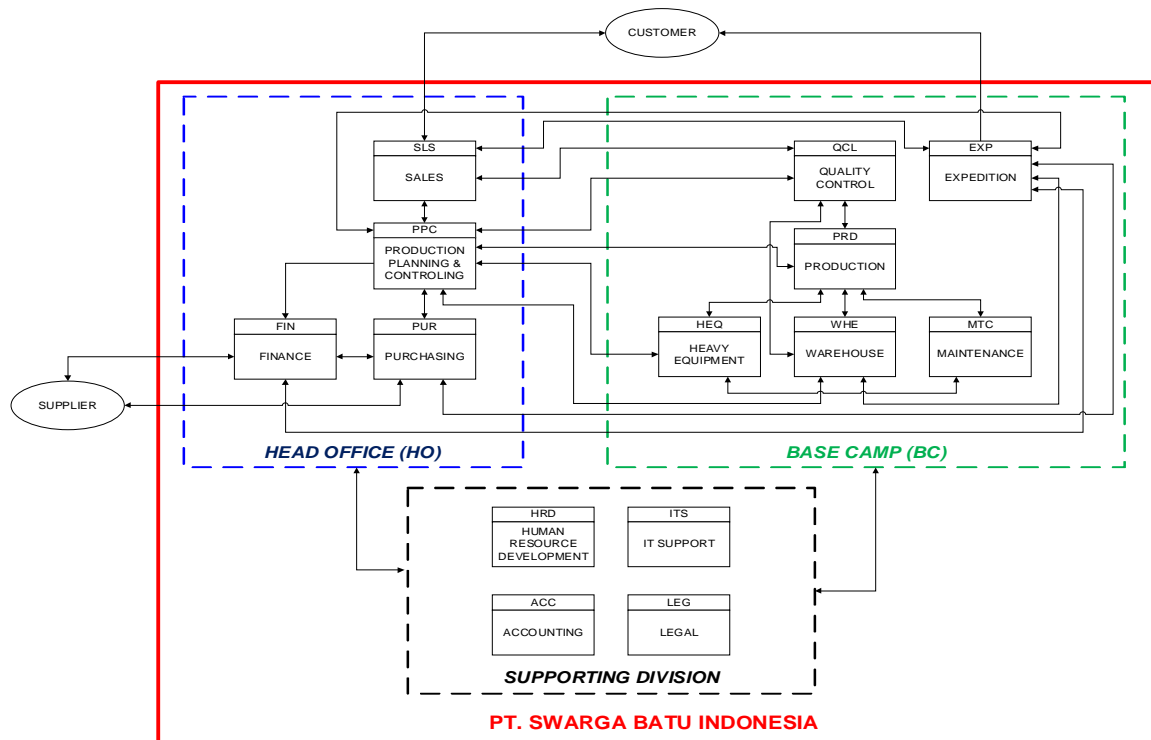
Figure 2. 3 Business Process of PT. SBI

3. Discussion

3.1 Initial Evaluation on Business Process and ERP PT. SBI

The observation of business characteristic of PT SBI was conducted in direct interviews to officers directly related to business activities in Pasuruan base camp. This activity took place for 4 days to conduct interviews to the main respondent, a plant manager and a production supervisor. In the interviews, the respondent provided important explanations regarding the process of receiving raw materials, processing of raw materials (production), and delivery of products as the basic business of the stone crusher industry. Based on the information, there were 2 types of raw materials differentiated according to the shape, flat stone and rounded stone. Flat stone spesifies thickness around 5 cm to 20 cm, while rounded stone spesifies round shaped stone with diameter around 40 cm to 60 cm.

The shape of the stone varies depending on the location of the mine belonging to the suppliers where the materials are taken. Based on the description from the production officer, the specification of the stone may vary because of the surface layer of the stone, the level of hardness of the stone, and the purity of the stone. Hollow stone surface conditions are more common in rounded stone, reducing the level of hardness. The stone purity factor is related to the presence of clay content attached to the stone. High clay levels such as flat stone will affect the quality of split stone production at PT. SBI. The condition is caused by the weather where clay levels will be higher in rainy season. Raw materials from supplies always have clay content but can only be identified through visual observation.

The worker would organize the stock of raw materials to facilitate production where newly arrived materials would be stacked above the old material with a structuring scheme as in figure 3.1. Total area of raw materials stock at base camp PT. SBI reached 3000 m^2.
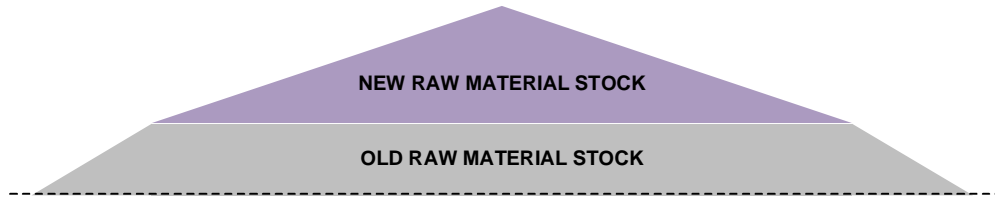
Figure 3. 1 Raw Material Positioning for Production Process

Production process at base camp PT. SBI performed calibration input production approach to obtain the calculation of total production in a production period. The calibration processes and procedures were carried out by weighing several samples of raw materials loaded by the machine and then calculating the average as seen on table 3.1. In the production process, the calculation of the total number of heavy equipment buckets that enter the jaw machine was equal to the total production in one period. The workers calculated the total raw material into the machine and multiplied that number with the calibration result to record the total amount of production in a production period (ton).

Table 3. 1 Production Input Calibration Sample of PT. SBI

No	Heavy Equipment	Calibration (Ton)		
		Bruto	Tara	Netto
1	Wheel Loader (XGMA 935E)	18.59	16.45	2.14
2	Wheel Loader (XGMA 935E)	18.78	16.42	2.36
3	Wheel Loader (XGMA 935E)	18.71	16.44	2.27
Date: 5 December 2017		Average Production Input		2.26

The workers at base camp PT. SBI also calculated production capacity per split stone product by conducting output calibration per product under stable production condition. For example, there were calculation for a production that produces 3 types of split stone products; split 0 – 5 mm, split 5 - 10 mm, and split 10 - 20 mm. The workers recorded and weighed the output of each output conveyor in 5 minutes. If the recorded output of each conveyor was 128 kg (split 0 - 5 mm), 131 kg (split 5 - 10 mm), 252 kg (split 10 - 20 mm), then the total sample output is 511 tons, and the composition of production for the total period was 25.04% for split 0 – 5 mm, 25.63% for split 5 - 10 mm, and 49.33% for split 10 - 20 mm as shown in figure 3.2. In this case if the total production input recorded for a period of 1,000 tons, then the production per split product recorded were 250.40 tons for split 0 – 5 mm, 256.30 tons for split 5 - 10 mm, and 493.30 tons for split 10-20 mm.
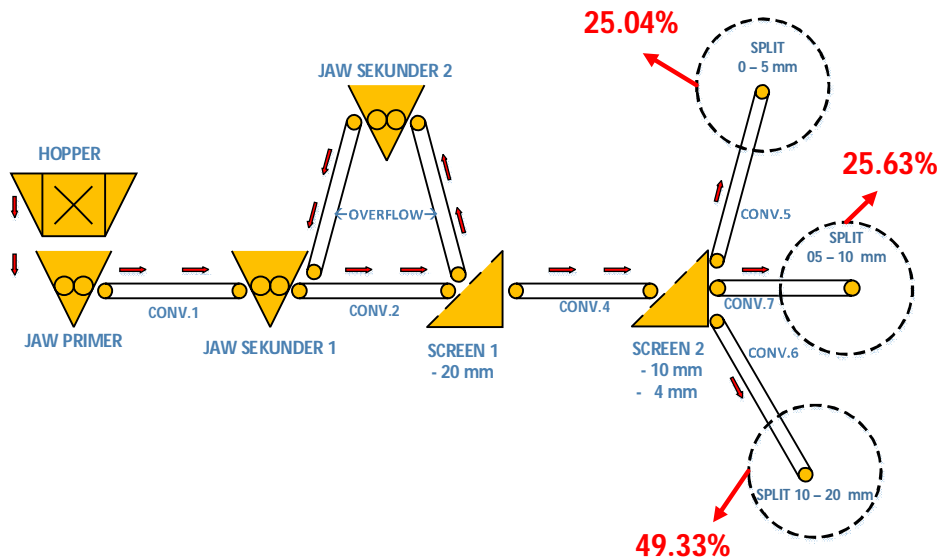

Figure 3. 2 Production Output Calibration Percentage Sample of PT. SBI

The results of the interviews showed that the stone crusher business is heavily dependent on the specifications of stone materials from the acceptance of raw materials, production processes, and product delivery. The production approach undertaken by the company tried to measure the averages input and output based on calibration results. In terms of validity, the most valid measurement was incoming raw materials and product delivery because the use of weighing scare unit in the factory. The production process had lower measurement validity because of the calibration measurement average method.

On the other hand, informants in ERP PT. SBI's innitial evaluation was 2 senior staffs, 1 manager, and 1 director of PT. SBI from finance and accounting division. The reason was the information from the previous UAT meeting that the finance and accounting division became the destination of information and business process data in ERP PT. SBI. The observation stage of ERP PT. SBI involved interviews with the team of informants to explore information related to the experience of employees in facing the condition of recording in the financial procedures related to ERP PT. SBI.

Important issue that distinguished financial activities on ERP PT. SBI was the configuration of acceptance and usage of company's current assets in first in-first out (FIFO) method. The FIFO configuration also applied to the recording of materials, for this case there is identification of constraints that may arise in the recording and use of materials for production. Simulation of recording of raw material acceptance of ERP PT. SBI is shown in Table 3.2.

Table 3. 2 Incoming Raw Material Receipt Simulation of ERP PT. SBI

No	Code	Receipt No.	Date	Weight (Ton)	Supplier	Unit Price	Amount (Rp)
1	1001	PN21001	01-Dec-17	12.30	A	50,000.00	615,000.00
2	1001	PN21002	01-Dec-17	11.12	A	50,000.00	556,000.00
3	1001	PN21003	01-Dec-17	12.23	A	50,000.00	611,500.00
4	1001	PN21004	01-Dec-17	12.34	A	50,000.00	617,000.00
5	1001	PN21005	01-Dec-17	14.10	A	50,000.00	705,000.00
6	1001	PN21006	05-Dec-17	10.00	B	53,000.00	530,000.00
7	1001	PN21007	05-Dec-17	15.01	B	53,000.00	795,530.00
8	1001	PN21008	05-Dec-17	13.00	B	53,000.00	689,000.00
9	1001	PN21009	05-Dec-17	12.32	B	53,000.00	652,960.00
10	1001	PN21010	05-Dec-17	14.10	B	53,000.00	747,300.00
11	1001	PN21011	06-Dec-17	12.00	A	55,000.00	660,000.00
12	1001	PN21012	06-Dec-17	11.00	A	55,000.00	605,000.00
13	1001	PN21013	06-Dec-17	13.10	A	55,000.00	720,500.00
14	1001	PN21014	06-Dec-17	12.34	A	55,000.00	678,700.00
15	1001	PN21015	06-Dec-17	11.11	A	55,000.00	611,050.00
			Total Stock (Ton)	**186.07**	Stock Amount (Rp)		**9,794,540.00**

The FIFO configuration made changes to the conditions of recording in the financial transactions that must follow the system. The author in this case has noted all problems related to the configuration of ERP PT. SBI to conduct discussion in order to solve main problems that may arise to the company's business processes.

The existence of the FIFO configuration guided the discussion and assertion to focus more on the inventory aspect or materials aspects where the process directly takes place in the production area. This is of course related to the treatment of recording approach to production and use of raw materials at the actual stock position in the company. The existence of these ERP record-keeping characteristics required more in-depth discussion to obtain fit identification approach of ERP PT. SBI.

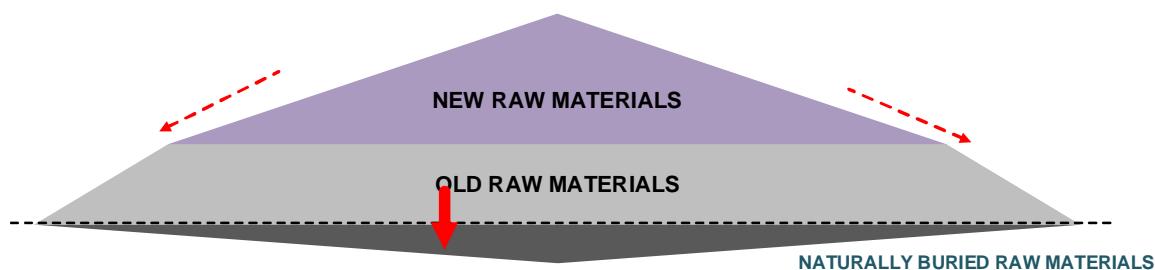## 3.2 Fit Evaluation on ERP PT. SBI and Business Process Characteristics

PT. SBI as one of the stone crusher company faced major obstacles in the deviation of materials in the base camp. The deviation was largely due to natural factors and process factors as shown in Table 3.3.

Table 3. 3 Deviation Cause Factors in Stone Crusher Business

Deviation	Natural Factor	Process Factor
Stock Condition	✓	✓
Production	✓	✓
Expedition	-	✓

The natural conditions resulted in the constraints in materials measurement at the time of the stock measurement in the area. To overcome these obstacles, the company applied measurement with calibration production approach and actual stock measurement approach. Other deviation conditions occured in the recording difference where there is a possibility of recorded stock but physically there is no stock and vice versa.

The previous discussion has described the situation of stockpiling materials in the process of stock positioning in the field. Under these conditions, new materials will be stacked on top of the old materials in order to facilitate structuring and retrieval for production. In general, all materials would be arranged to resemble a cone shaped form for easy access and maneuvering of the heavy equipment. This allowed the heavy equipment to crawl onto the heap. The more material deposited would increase the weight of the heap so that it would put downward pressure and made the bottom most embedded in the soil (figure 3.3). The field officer would have difficulty in measuring the embedded material because it is not visible. The disadvantage of such embedded stock measurement was one of the characteristics of the stone crusher business. Other conditions occured due to natural factors such as rain that affect the amount of materials. This condition affected the stock of raw materials and stone split product materials. Rain water flow wouldcarry a smoother material located on the surface of the stockpile and result in material loss. In some cases, there was a possibility when the physical material stock exhausted, but the worker could cut and fill the buried material and reproduced the stock. Although it would provide potential revenue but this is very rare because the company needs to always keep up the buffer stock.

NEW RAW MATERIALS

OLD RAW MATERIALS

NATURALLY BURIED RAW MATERIALS

Figure 3. 3 Materials Loss From Its Natural Factor

The production process involved the retrieval of raw materials which was then incorporated into a stone crusher machine. Heavy equipment loaded the material from the slopes or on the heap to facilitate the production process. Position of materials that could be taken depends on the type of heavy equipment model. Wheel loader was only able to take the materials in the slope position while the excavator was more flexible in taking the materials in the top position and the slope. If the materials on the slope was taken by the machine, then the material at the top position would fall to a slope position as seen in Figure 3.3. Materials that have been uldoaded into the machine would be crushed down into smaller fractions and filtered by the screen (sifter) in the series. In open space conditions such as base camp PT. SBI, the most refined material would be blown away naturally. The amount of fine material that was blown could not be calculated precisely although the amount was somehow small but still counted as a deviation of losses in production. Due to the stockpiling characteristics, the taking of materials in production activities was carried out by the method of Last in First out (LIFO) or mixing. This stock mixing occured when the feedstock is thinning allowing the machine to reach all areas. By business process, LIFO and average methods became one among possible approaches in recording the use of such materials.

Based on the information from workers at base camp PT. SBI, production record changed if there was a change in screen size or the addition of fraction of the product to produce products with certain specifications. For example, officers in the field recorded the production with the composition according to calibration

result but physically there was a difference between the recording conditions and the actual conditions. In this condition, there were 2 possibilities when the physical stock ran out but the recorded stock was still listed or the physical stock was visible but the lsited stock ran out. If the physical stock was depleted, it would certainly be a loss in the production of registered stock. For the condition of the stock was recorded but the physical stock exists, it will become a potential production income for the company. The phenomenon in the production of stone crusher caused deviation which could be a potential loss or profit for the company.

The management also applied measurements with an actual physical stock approach to measure the total existing stock of both raw materials and finished products. This measurement was done by calculating the existing stock volume according to the shape. In general, the material would be structure similar to cone like shape to facilitate field control as well as the process of positioning the material. The field officer measured the volume of the materials by volume formula according to the stock form, measuring the material circumference, and the stock height. Once the volume obtained, it would be converted into a tonnage measurement in correspondence of its coefficient of material volume weight according to its type as seen in table 3.4.

Table 3. 4 Volume Weight Specification of Materials in PT. SBI

Materials Type	Volume Weight (ton/m3)
Raw Materials (Stone)	1.61
Split Stone 0 - 5 mm	1.44
Split Stone 5 - 10 mm	1.33
Split Stone 10 - 20 mm	1.51

In addition, business processes that were closely related to these characteristics were purchasing at stock position, PPC (production, planning, & controlling) on production positions, and sales on delivery position either in head office or base camp. The existence of information from the process of quality control in base camp provided the opportunity of recording deviation on each condition based on business characteristics. The most valid measurements were those that can be measured by weighing stations using tonnage units (ton). Purchasing and sales processes had better level of validity than production processes that used a conversion approach. In further discussion, there were conditions in loss of stock (materials loss) and production loss by nature factor and process factor. The existence of deviation beame the basic characteristic in stone crusher business which could book potential loss and profit for company due to obstacle in physical measurement.

ERP PT. SBI had a feature to organize production materials. The feature was used to record transactions of raw materials acceptance, use of raw materials for production, and existing stock. Based on interviews with related divisions and vendor, there was information that ERP PT. SBI did not have a configuration in the production of raw material in automatic settings. Basic features of ERP PT. SBI was the recording of usage of company asset using First in First out (FIFO) method. The purchase of company assets used for production undergoes different usage processes between the ERP system and the actual conditions of the processes occurring in the field. This condition became the main discussion in this research.

With the FIFO configuration, the ERP PT. SBI performed data processing based on the use of assets in production. ERP PT. SBI recorded all usage of company current assets related to production of the following types:
- machine parts
- heavy equipment parts
- lubricants
- diesel oil
- materials (raw materials)

In the type of company assets such as engine parts and heavy equipment parts was included in the type of assets that follows on a unit basis. Since it was unitary, a FIFO listing for that item was still possible. The company processes and policy also supported for the application of usage based on the order of arrival. For example, for the use of rubber v-belts inputed to the system, technically the officer would coordinate to use the goods that come early because it is closely related to the quality of spare parts that have a lifetime value.

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In the configuration, ERP PT. SBI also technically recorded the use of company assets such as diesel oil and lubricants using FIFO method. The application of diesel oil using this method was still in accordance with its application in the field because the company only uses 1 diesel oil tank with a capacity of 8000 liters with average use for 1 month. The field officer would get a notification from the administrative officer if the minimum recorded manual stock drops below 1000 liters. The company implemented the procedure because it already has a trusted supplier such as PT. AKR Corporindo, PT. Sinar Anugerah Energi, and PT. Major Energy Commerce that can ensure consistent fulfillment of needs. The use of lubricants in production was also still in accordance with its application because of the purchase of lubricants in the form of drums/packaging. The company procedure required field workers to use the lubricants to run out of new packaging.

Among the types of company assets used in production, the stock of raw materials had different characteristics from its listing in the ERP PT. SBI. The system recorded the use of material in FIFO as simulated in table 3.5 with the conversion of data based on the time sequence.

Table 3. 5 Raw Materials Simulation in Production Process of ERP PT. SBI

DATE	PURCHASING			PRODUCTION			STOCK		
	WEIGHT (TON)	PRICE (IDR)	AMOUNT (IDR)	WEIGHT (TON)	PRICE (IDR)	AMOUNT (IDR)	WEIGHT (TON)	PRICE (IDR)	AMOUNT (IDR)
30-Nov-17	-	-	-	-	-	-	100	50,000.00	5,000,000.00
1-Dec-17	62.09	50,000.00	3,104,500.00	110.00	50,000.00	5,500,000.00	52.09	50,000.00	2,604,500.00
2-Dec-17	-	-	-	20.00	50,000.00	1,000,000.00	32.09	50,000.00	1,604,500.00
3-Dec-17			-	-	-	-	32.09	50,000.00	1,604,500.00
4-Dec-17			-	-	-	-	32.09	50,000.00	1,604,500.00
5-Dec-17	64.43	53,000.00	3,414,790.00	20.00	50,000.00	1,000,000.00	12.09	50,000.00	604,500.00
5-Dec-17	-	-	-	-	-	-	64.43	53,000.00	3,414,790.00
6-Dec-17	59.55	55,000.00	3,275,250.00	12.09	50,000.00	604,500.00	26.52	53,000.00	1,405,560.00
6-Dec-17				37.91	53,000.00	2,009,230.00	59.55	55,000.00	3,275,250.00
						TOTAL STOCK	86.07	STOCK AMOUNT	4,680,810.00

The simulation illustrates the use of the old material recorded in production proportionally in the order of time, where if the stock at a price in one period is exhausted it will use a newer price. The configuration is of course very contrary to the conditions in the field that have been discussed previously. The application of the FIFO method in production will be very difficult to do because of the stock of stacked stones for the purpose of stock buffers that facilitate heavy equipment flexibility in positioning the materials.

ERP PT. SBI configuration determined the recording position in the use of company assets in the system. The existence of different characters with the configuration was mainly found in the use of materials. Material usage was a very important part for the company because it is company's current assets with massive amount and positioning. Companies will certainly encounter losses if there are errors or significant differences that occur in it.

Another important condition to consider was the recording of the difference between current assets. This could occur in the position of machine parts, heavy equipment parts, diesel oil, lubricants, and materials. The company has applied the physical stock measurement mechanism to record the possibility of difference of stock position both the inventory goods and materials. Stock units shaped items would be easier to identify, while stocks in sizes like lubricants, diesel oil, and materials were harder to identify. For diesel oil and lubricants, they were still possible to determine the difference due to the nature of the stock that does not take up massive space. The materials had a characteristic that was difficult to measure because it needed massive space, besides that there was material loss condition from the missing parts due to natural factors and process factors. The company anticipated this with a cutoff mechanism in which officers stopped production and aligned all data. This was certainly time consuming and allowed opportunity loss for the company.

The solution in this discussion provided an optional adjustment that enabled the use of the company's raw materials in production. The possibility of significant adjustment focuse on the condition of process characteristics and system configuration by making the mechanism of recording losses and company's earnings from the production process.

3.3 Management Solution

The existence of condition difference of business process characteristic and ERP PT. SBI required technical solutions to align the ERP implementation. This requirement was related to the addition of functional aspect in the system that does not exist in the ERP PT SBI to record the condition of raw materials, production, and the existing stock. This adjustment specifically refered to the internal characteristics of PT. SBI related to the recording of deviation on the ERP system which will be booked financially and then being posted in value of the position in cost or earning in the financial statements. The following is an additional function formula that can be used:

$$\textbf{Purchasing} = \textbf{Stock} + \textbf{L}_{\textbf{Stock}}$$

Purchasing	= Raw materials purchasing for production
Stock	= Inventory position of raw materials and finished goods
L_{Stock}	= Loss Stok

$$\textbf{M}_{\textbf{Total}} = \textbf{P}_{\textbf{Total}} + \textbf{L}_{\textbf{Production}}$$

M	= Raw materials for production
P	= Production
$L_{Production}$	= Production Loss

$$\textbf{E} = \textbf{P/M}$$

E	= Production efficiency
P	= Production
M	= Raw materials for production

Additional functions could be made to record the deviation systematically, so it could be recorded in a special COA (chart of account) for production costs that are defined according to the company's cost position. In addition, characteristically there was a possibility of other earning from the production sperspective, but this might be very rare and need recording action in the COA with other production earning labels. ERP PT. SBI required adjustment with the addition of functions to be able to meet the calculation of production deviation and its conversion at posting losses and company's earnings.

4. Conclusions

The solution of this study provided identification of improvements to ERP PT. SBI by identifying the deviation factor that occurs in the production process. Production deviation information should be added as part of a report that serves to validate the deviation on the company's production. Next, the required repair function on ERP PT. SBI to validate stock deviation and production will be integrated in the system. The records can be made in a format appropriate to the company's requirements and should be standardized based on the company's COA post using Other Cost and Other Revenue accounts. Based on these conditions, the deviation in the form of production losses or production earning can be recorded and converted into a report on the company. The conditions for the deviation in the stock of raw materials may also be recorded on the account to display income or loss information on the stock position of the company. The solution provides an opportunity for PT. SBI to make ERP fit the business process characteristics for the stone crusher business.

5. Recommendation

This study discusses ERP issues of PT. SBI on validation of system functions performed after implementation. Future research is expected to discuss the deeper part of the ERP function requirement analysis. In the analysis of the requirement is expected to formulate a new design related to functional requirements and non-functional needs of ERP systems. Future research is expected to result in a more specific framework addressing the needs of processes and systems by focusing on more detailed technical solutions therein.

ERP PT. SBI must fit to the business process needs. The technical deviation marking technical measures provided in this study should be made into a work program that is to achieve fit nto the ERP system and business processes of the company. The program can be a benchmark to what extent the adjustment has been made so that it can be a real solution to the problems encountered by PT SBI.

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