DESIGNING PERFORMANCE MANAGEMENT SYSTEM USING BALANCED SCORECARD FOR CHEMICAL SERVICES CONTRACTOR IN PT. XYZ

Syukirman
School of Business Management, Bandung Institute of Technology, Bandung, Indonesia
Email: syukirman@sbm-itb.ac.id

Abstract

This paper is focus on designing company performance management in operational level for chemical services contractor at PT. XYZ that produced crude oil in Indonesia. In the oil treatment, some chemicals are used that supplied by contractor. In performing the contract services, the chemical contractor provides reports regularly to PT. XYZ, but the report was not integrated and did not shown the comprehensive contractor's performance. Meanwhile, PT. XYZ has no integrated performance reporting system to capture overall contractor performance. There is a strong need from PT. XYZ to improve the competency of its business partners, including the chemical contractor. PT. XYZ wants to conduct contractor performance appraisal to capture lessons learned as well as to document the performance of the contractor. Through contractor performance appraisal, the company would increase it performance standard by recognizing contractor excellent performance. To improve this condition, PT. XYZ designing performance management system based on Balanced Scorecard with some objectives and critical success factors. The focus of scorecard is to define metrics that shall be tracked to validate the achievement of contractors, drive and support the right behaviors and improved performance, and in a manageable size and those which add value. The metrics focused on five objectives, i.e.: Capital Stewardship, World Class Operation, Continuous Improvement, Incident Free Operation (IFO), and People Development. Through this improvement, the performance management system developed is much better than contractor's reporting system and enable the contractor to improve their performance. However, it was found that some weaknesses still existed and need further continuous improvement to achieve operational excellence as the objective of the company.

Keywords: Balanced Scorecard, Performance Management, Chemical Contractor

1. Introduction

Introduction of PT. XYZ

PT. XYZ is a subsidiary of one of the largest multinational oil company. PT. XYZ is largest oil producers in Indonesia, more than 50% of Indonesian production. Currently, PT. XYZ operates dozens oil and gas fields in Sumatra. PT. XYZ employs around 5,000 highly skilled personnel. A number of business partners also support its operations and they employ around 25,000 workers. More than 97% of the employee is national employees. During its operation in Indonesia, PT. XYZ has been produced more than 11 billion oil by using a sophisticated technology.

PT. XYZ adopts its corporate vision and values in conducting its business in Indonesia. The corporate vision is: "to be the global energy company most admired for its people, partnership and performance". In doing its vision, PT. XYZ has a principle called Corporate Way, which is getting result in a right way. PT. XYZ foundation built from some values which underlying company operation and be its identity. The vision means that the company: safely provide energy products vital to sustainable economic progress and human development throughout the world; are people and an organization with superior capabilities and commitment; are the partners of choice; earn the admiration of all our stakeholders – investors, customers, host governments, local communities and our employees – not only for the goals to achieve but how to achieve them; and deliver world-class performance. The value of the company is: the company's foundation is built on their values, which distinguish them and guide their actions. Company conducts its business in a socially responsible and ethical manner. Company respects the law, support universal human rights, protect the environment and benefit the communities where it works.

One of operating unit in PT. XYZ is called Heavy Oil, which is operates heavy oil field. Heavy oil manages oil production from reservoir to shipping point. Crude oil treatment in oil field of PT. XYZ is simply an extraction of oil from production fluid. Oil and its associates from reservoir are produced from producer well and then flow to gathering stations. In the stations, water and oil separated by gravity with the aid of chemicals. Crude oil produced then pumped to shipping point. While the water treated further by a series of process to produce steam generator feed water. In the generator, the water boiled to produce steam and then injected into subsurface to increase reservoir temperature. Steam injection eventually will increase fluid production.

In the oil treatment, some chemicals are used with a different function. All chemical are supplied by one contractor to avoid incompatibility between these chemical. Main chemicals used for oil and water treatment are demulsifier, reverse demulsifier, and flocculent. Chemicals are absolutely needed to treat production fluid to produce quality oil and water and to protect processing equipment from scale and corrosion. Generally, chemical used are specialty chemicals which is specific to the type of oil and water treated. Chemical supply and including its services are handled by chemical contractor. Payment method is performance based for main chemicals; where the contractor is paid based on total oil and water produced at a certain unit

rate. While volume based payment method is applied for supporting chemical; where the contractor is paid based on total volume chemicals used. A penalty with a certain value will be applied when contractor failed to meet the company requirements.

As adopt a contract service, the contractor is not only supply the chemicals, but also furnish all equipment, tools, warehouse, laboratory and personnel in site, that required in treating produced fluid. Contractor also responsible to monitor chemical injection so that company can run a safe, effective, and smooth field operation as well as produce crude oil and water which meet the specification. This type of contract impacted gathering stations operation both positive and negative. The positive impact that perceived by operation such as: no need much intervention from operator on chemical rate adjustment and monitoring and free maintenance work for chemical pump by company. However, some negatives impact also perceived by operation. Contractor sometimes set chemical injection at minimum rate for cost saving. Chemical optimization effort by contractor will not give financial benefit to company. Contactor can easily changes chemical types without notice the user, resulted a potential for negative impact to operation.

Problem Formulation

As the contractor payment is based on its performance in term of product quality, the quality and performance monitoring is crucial for the company. Due to strong correlation between performance and payment, contractor performance monitoring is very important to PT. XYZ and contractor. In performing the contract, the chemical contractor provides reports regularly to PT. XYZ, but the report was not integrated and did not shown the comprehensive contractor's performance. The reports are prepared and sent by contractor separately to different users in the company and mostly focused only on operational performance of contractor. Meanwhile, PT. XYZ has no integrated performance reporting system to capture overall contractor performance. This condition complicates the company to assess the overall performance of the chemical contractor.

PT. XYZ has some issue regarding to contractors' performance, including chemical contractor. In performing the contract, contractor sometimes not meets the company requirement. In term of operation, it can be operation upset and off spec quality of crude oil and water product. It is especially in the first years. The contractor also sometimes not complies with safety and environmental regulation. Lack of performance management system for contractors may lead the company failed to capture some issues and gaps on contractors' performance.

Regarding to this issue, there is a strong need from PT. XYZ to improve the competency of its business partners, including the chemical contractor. PT. XYZ has

to conduct contractor performance appraisal to capture lessons learned as well as to document the performance of the contractor. Through contractor performance appraisal, the company would increase it performance standard by recognizing contractor excellent performance. A solid documentation on contractor performance is also required by government regulation to enable the company to prevent participation of non-performing contractors in next procurement process.

2. Conceptual Framework

2.1. Theoretical foundation

The balanced scorecard is a strategic planning and management system that is used extensively in business and industry, government, and non-profit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals. It was originated by Dr. Robert Kaplan (Harvard Business School) and David Norton as a performance measurement framework that added strategic non-financial performance measures to traditional financial metrics to give managers and executives a more 'balanced' view of organizational performance. While the phrase balanced scorecard was coined in the early 1990s, the roots of the this type of approach are deep, and include the pioneering work of General Electric on performance measurement reporting in the 1950's and the work of French process engineers in the early part of the 20th century.

The Concept of Balanced Scorecard

The aim of the balanced scorecard framework is to give managers a comprehensive view of the business and allow them to focus on the critical areas, driving the organization's strategy forward. The balanced scorecard retains a highlight on financial objectives as a gauge for identifying how the system is performing (Kaplan and Norton, 1992; Kaplan and Norton, 1996a). For a number of years there have been numerous large organizations that have used the balanced scorecard or other models resembling scorecards as a method of performance measurement and as a performance driver.

The purpose of the balanced scorecard is to help communicate and implement an organization's strategy. Hence, the balanced scorecard is a framework containing a set of financial and non-financial measures chosen to aid a company in implementing its key success factors, which are defined in the company's strategic vision. To counter the traditional emphasis on the implicit short-termism of profit, a financial aspect, Kaplan and Norton (1992) introduced three additional measurement categories that highlight non-financial aspects. These are customer satisfaction, internal business process, and learning and growth. Kaplan and Norton think of these three additional categories as sets of measures of the firm's drivers of future performance, whereas the financial perspective represents the past performance.

Balanced Scorecard Perspectives

The balanced scorecard suggests viewing the organization from four perspectives, and to develop metrics, collect data and analyse it relative to each of these perspectives:

The Learning & Growth Perspective

This perspective includes employee training and corporate cultural attitudes related to both individual and corporate self-improvement. In a knowledge-worker organization, people are the main resource. In the current climate of rapid technological change, it is becoming necessary for knowledge workers to be in a continuous learning mode. Metrics can be put into place to guide managers in focusing training funds where they can help the most.

The Business Process Perspective

This perspective refers to internal business processes. Metrics based on this perspective allow the managers to know how well their business is running, and whether its products and services conform to customer requirements (the mission). These metrics have to be carefully designed by those who know these processes most intimately; with our unique missions these are not something that can be developed by outside consultants.

The Customer Perspective

Recent management philosophy has shown an increasing realization of the importance of customer focus and customer satisfaction in any business. Poor performance from this perspective is thus a leading indicator of future decline, even though the current financial picture may look good. In developing metrics for satisfaction, customers should be analysed in terms of kinds of customers and the kinds of processes for which providing a product or service to those customer groups.

The Financial Perspective

Kaplan and Norton do not disregard the traditional need for financial data. Timely and accurate funding data will always be a priority, and managers will do whatever necessary to provide it. In fact, often there is more than enough handling and processing of financial data. With the implementation of a corporate database, it is hoped that more of the processing can be centralized and automated. But the point is that the current emphasis on financials leads to the "unbalanced" situation with regard to other perspectives. There is perhaps a need to include additional financial-related data, such as risk assessment and cost-benefit data, in this category.

Fig. 1. The Framework of balanced scorecard (adapted from Kaplan and Norton, "Using the Balanced Scorecard as a Strategic Management System," Harvard Business Review (Jan-Feb 1996)

However, Kaplan and Norton (1993) reported in a Harvard Business Review article that each company requires developing its own performance scorecard suited to improving its business performance as judged by its own stakeholders. The balanced scorecard is not a template that can be applied to businesses in general or even industry-wide. Different market situations, product strategies and competitive environments require different scorecards. Business units devise customized scorecards to fit their mission, strategy, technology and culture. In fact, a critical test of a scorecard's success is its transparency: from 15 to 20 scorecard measures, an observer should be able to see through to the business unit's competitive strategy (Kaplan and Norton, 1993). This means that an organization can have more or less than three additional categories since each of the additional categories is derived from the firm's key performance drivers.

The balanced scorecard emphasizes that financial and non-financial measures must be a part of the information system for employees at all levels of the organization. The scorecard should translate the business unit's mission and strategy into tangible objectives and measures. Moreover, these measures are balanced not only between external measures (shareholders and customers) and internal measures (critical business process, innovation, and learning and growth) but also between the result measures (outcomes) and driver measures (measures for future improvement). The scorecard uses measures to communicate and to inform employees about the drivers of current and future success (Kaplan and Norton, 1996a).

A major strength of the balanced scorecard is the emphasis that it places on linking performance measures with business unit strategy. Kaplan and Norton (1996b) also

introduced a framework to link the scorecard with the management of strategy, the so-called "strategic framework for action". It consists of four specific processes as follows: clarify and translate vision and strategy; communicate and link strategic objectives and measures; plan, set targets, and align strategic initiatives; and enhance strategic feedback and learning.

2.2. Chart design of problem solving

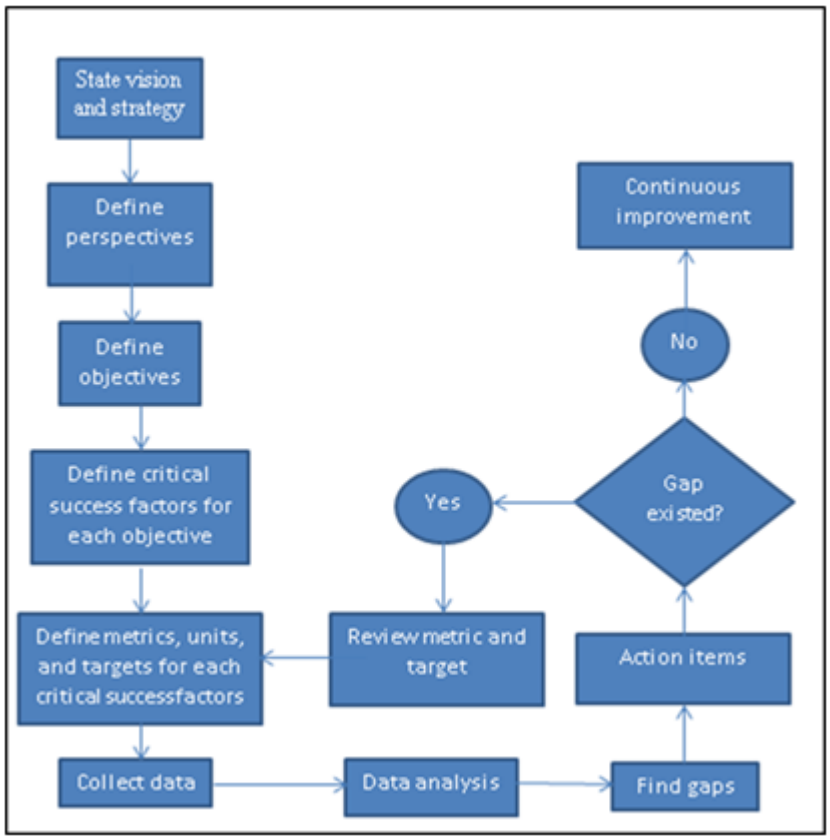

Fig. 2. Chart Design of Problem Solving

3. Research Methodology

3.1. Flowchart of research methodology

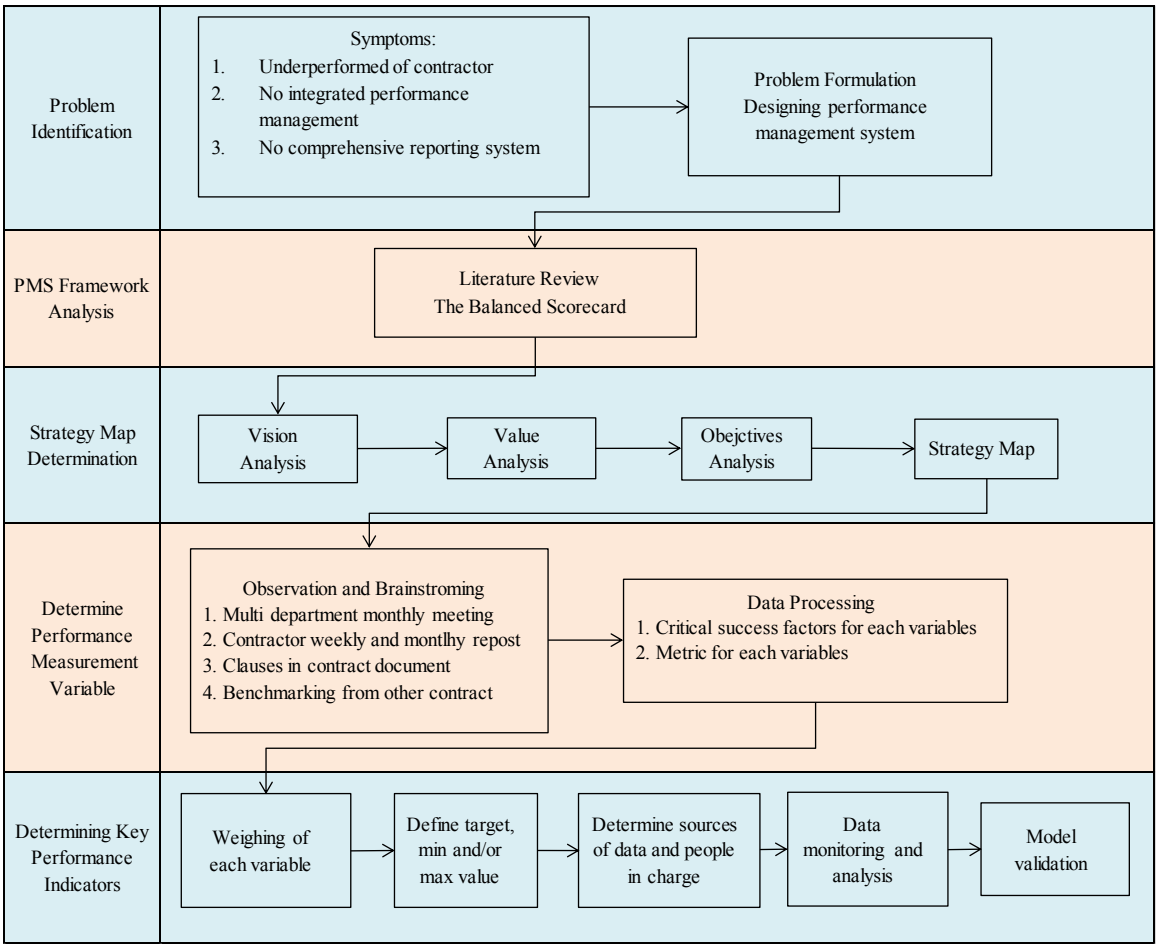

Fig. 3. Research methodology flowchart

3.2. Strategy Maps

To improve contractor's performance management, PT. XYZ designing performance management system based on balanced scorecard. The focus of scorecard is to define strategy map based on some perspectives with some objectives. The objectives are developed based on vision and values of the company. The company then developed certain critical success factors and metrics for each objectives that shall be tracked to validate the achievement of contractors, drive and support the right behaviours and improved performance, must be specific, measurable, attainable, realistic, and timely (SMART), and in a manageable size and those which add value.

Strategy maps are communication tools used to tell a story of how value is created for the organization. It shows a logical, step-by-step connection between strategic objectives (shown as ovals on the map) in the form of a cause-and-effect chain. Generally speaking, improving performance in the objectives found in the Learning & Growth perspective enables the organization to improve its Internal Process perspective Objectives which in turn enables the organization to create desirable results in the Customer and Financial perspective. The scorecard will be focused on

the four perspectives with five objectives: Capital Stewardship, World Class Operation, Incident Free Operation (IFO), Continuous Improvement, and People Development.

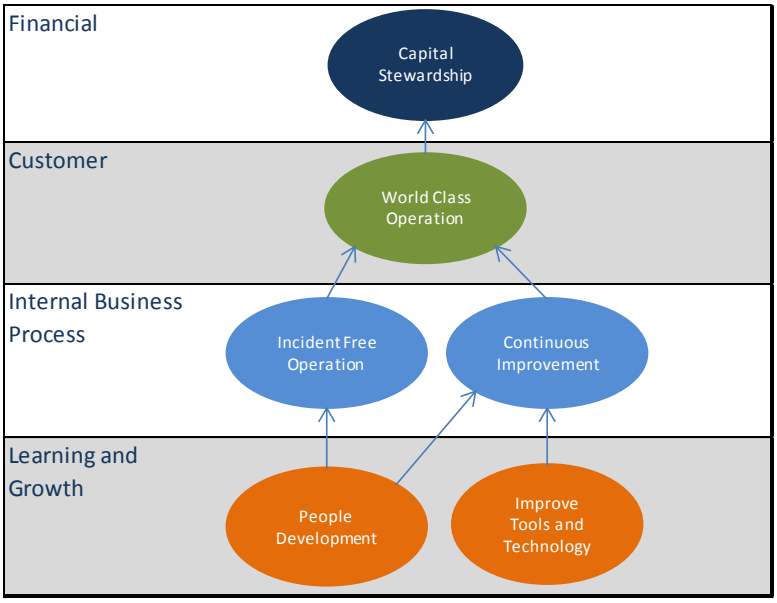

Fig. 4. Strategy map

3.3. Data Collection (Sampling)

Transforming the company vision and values to objectives and strategy maps, and then defining critical success factors and metrics need involvement of multidepartment teams, including Operation, Engineering, Safety, Supply Chain Management, and Base Business. A method to gather data and aspiration in defining critical success factor from related team is through observation and brainstorming. A task force consists of representatives from related team was developed to conduct a meeting periodically to collect ideas. The brainstorming is focus on review company business plan objectives and chemical contractor annual performance as the basis to develop and determine contractor's performance measurement variables. Chemical contract document and also benchmarking from other contract performed in the company are also the source of data needed to develop performance measurement variables. Each people involved are encouraged to issues their ideas in defining the success factors. All ideas are recorded and then variables data listed to be sorted based on its relevance and importance suited to monitor contractor's performance.

3.4. Data Processing

As the outcome of the meeting, some critical success factor variables for each objective are defined. Metrics then developed for each critical success factors based on performance metric system from contract document and another metric from company. A certain units also defined that suitable for each metric. Then weighing applied to each objectives and its metrics.

A certain target also set for each variable based on the company requirements that the contactors have to be achieved. The source of data and the responsible person to collect the data also defined. The data should be reliable based on reliable measurement systems and based on agreement between the company and contractor.

3.5. Data Analysis and Model Validation

After the balance scorecard developed, a review meeting conducted. The purpose of the balanced scorecard meeting is to review and to analyse the model by measure, evaluate, track all data to improve the quality of the service provided under the Heavy Oil Chemical Services contract. The scorecard review meeting is also to provide a regularly scheduled and structured forum for contractor and company to review performance of the contract for the designated period and look for opportunities to drive to excellent performance.

The scorecard meeting shall be held to review the contractor's service delivery compared to the expectations set out by company to validate the existing critical success factors, metrics, units, and weighting whether it is still relevant to company expectations. It is also to review the whether the targets are attainable and realistic to be achieved by contractor. Scorecard meeting shall be focused on overall performance of the service over the designated time period. Performance data, metrics, and other service quality indicators shall be tracked by the Operation team. This information will be utilized to manage performance during the contract term and aide decision makers when it comes time to evaluate whether the contract should be extended or re-sourced upon expiration.

3.6. Performance Review and Improvement

To review the performance of the contractor, a team meeting will be conducted periodically to review some agenda. The agenda are to review contractor's performance and analyse its trends. It is also to share activity update and resource requirements, also to share and implement best practices and lessons learned when applicable. In this meeting, it is also recognize superior performance of contractor. The scorecard is reported monthly and evaluated together with the contractor quarterly to analyse any gaps found. Any gaps and technical issues will be review and define potential solution. Then it will develop action plans to improve performance, and document and report valued added process changes. Through this review, any gaps that still existed will be analysed and improved continuously to achieve operational excellence as the objective of the company.

4. Research Finding

Based on intensive analysis of company's nature of business, vision, values, objectives, and strategy maps, also the characteristic of balanced scorecard framework, the performance management system design for chemical contractor can be summarized as in Table 1, 2, 3, 4, and 5 below.

a. Financial perspectives

Table 1. Capital Stewardship Objectives Scorecard

OBJECTIVES	CRITICAL SUCCESS FACTORS	METRICS	UNITS	WEIGTING	TARGET		
					MIN	TARGET	MAX
CAPITAL STEWARDSHIP				**4**	**80%**	**90%**	**100%**
Deliver Chemical Contract Services	Track and monitor contracts execution	Yearly Contract spending	$MM	2	15,600	14,400.00	13,200
	Penalty applied	Number of penalty applied	number/year	2	8	10	12

The Capital Stewardship objectives are focused to track and monitor annual contract spending to contractor. This is to ensure that the spending is not much differs from the cost estimate, so the budget will be enough until the end of contract. It also monitor number of penalty applied as a result of contractor under perform. High number of penalty will eventually decrease payment to contractor.

b. Customer perspective

Table 2. World Class Operation Objectives Scorecard

OBJECTIVES	CRITICAL SUCCESS FACTORS	METRICS	UNITS	WEIGTING	TARGET		
					MIN	TARGET	MAX
WORLD CLASS OPERATION, MAINTENANCE AND RELIABILITY				**64**	**80%**	**90%**	**100%**
Chemical Quality Performance	Demulsifier	BS&W (Basic Sediment & Water) of treated oil at shipping tank effluent of any CGS must be consistently ≤ 0.8% (one day average)	%	10	100.0%	100.0%	100.0%
		BS&W of treated oil at highest 2 feet of any wash tank must ≤ 1%	%	10	100.0%	100.0%	100.0%
		BS&W of treated oil measured at Receiving Tank in Dumai must be consistently ≤ 1% (one day average)	%	1	100%	100.00%	100.00%
	Reverse Demulsifier	Oil content of treated produced water at water leg of FWKO tank at each CGS shall meet the requirement (for total trains one day average)	ppm	10	100%	100%	100%
		Oil content of treated produced water at water leg of	percent/month	10	100%	100%	100%
	Flocculent	Oil content in effluent water from downstream of MFU (one day average)	ppm	10	100%	100%	100%
		Turbidity in effluent water from downstream of MFU	NTU	5	100%	100%	100%
	Corrosion inhibitor	Percentage of corrosion coupon which have internal	%	2		100%	
	Scale inhibitor	Percentage of scale coupon which have Scale growth ≤ 70 mg/ft2/d with agreed dosage by both company and contractor	%	2		100%	
	Salt	Percentage of meet spec materials per months	%	1	100%	100%	100%
	Caustic soda	Percentage of meet spec materials per months	%	1	100%	100%	100%
DSST Services	Perform DSST and PRC Monitoring	Percentage of compliance of DSST jobs (execution vs. request)	%	1	100%	100%	100%
		Percentage of PRC Monitoring per well Month 12 >/= 2 ppm	%	1	100%	100%	100%

In the World Class Operation objectives, the company is focused to monitor contractor performance in delivering high quality chemical and services to

produce quality crude oil and water product. Company, as the customer of contractor, set high expectations on the performance target. Failed to achieve the target will lead penalty applied to contractor. This is critical to be monitored as the contractor has a possibility to cheat in their report. Random audit and data verification are needed by the company to avoid false data.

c. Internal business perfective

Table 3. Continuous Objectives Scorecard

OBJECTIVES	CRITICAL SUCCESS FACTORS	METRICS	UNITS	WEIGTING	TARGET		
					MIN	TARGET	MAX
CONTINUOUS IMPROVEMENT				**4**			
Continous Improvement	Chemical/process improvement	Number of Lean Sigma project	number/year	2	1	2	2
	Product/service improvement	Number of improvement	number/year	2	1	1	2

In the Continuous Improvement objective, the company need to monitor process and chemical product improvement conducted by contractor. This is to ensure that contractor is able to capture any chemical performance gap and improve it. Contractor also may improve their internal process through lean sigma project to reduce cost and efficient operation.

Safety is the most important issue within the company. All business partners are encouraged to have same perspective and awareness on safety. Failed to meet company's expectation on safety performance will lead to contractor to be banned and contract discontinued. The metrics shown below are the combination of safety performance and initiatives to avoid incident and injury.

Table 4. Incident Free Operation Scorecard

OBJECTIVES	CRITICAL SUCCESS FACTORS	METRICS	UNITS	WEIGTING	TARGET		
					MIN	TARGET	MAX
INCIDENT FREE OPERATION				**23**	**80%**	**90%**	**100%**
Zero Is Attainable	Conduct field/work-shops visit/inspection and BBS Observations by Contractors Management.	Number of field visit conducted by Management	number/year	2	2	3	4
		Percentage of field visit findings followed-up by Management	percent/month	2	90%	100%	100%
		Number of Safety observations conducted by Contractors workforce.	number/year	2	400	450	500
	Implement SWA/SSWA/TIIF/FSWP /Pre-trip Inspection/JMP/JSI	Motor Vehicle Crash (MVC)	number/year	3	0	0	0
		Total Recordable Incident (TRI)	number/year	4	0	0	0
		Days Away From Work (DAFW)	number/year	3	0	0	0
	Inspection program of working tools and vehicle and heavy equipment.	Availability of Pre-Trip Inspection program and documentation for heavy equipment	percent/month	1	95%	100%	100%
		Availability of Pre-Trip Inspection program and documentation for light vehicle	percent/month	1	95%	100%	100%
		Number of inspection program (CGS) conducted by PM on injection facility	number/month	1	4	5	6
Build IIF Culture and Safety Awareness	HAZID implementation	Number of near-mis/hazards identified/reported and followed up.	number/year	1	90	100	110
	Promote Safe Driving Behavior	Number of Commentary Driving conducted to work force	number/year	2	84	90	95
	Conduct / attend FSWP Training	Number work force who attend the FSWP training	number/year	1		90	

d. Learning and growth perspective

Table 5. People Development Scorecard

OBJECTIVES	CRITICAL SUCCESS FACTORS	METRICS	UNITS	WEIGTING	TARGET		
					MIN	TARGET	MAX
PEOPLE				**5**	**80%**	**90%**	**100%**
Strengthen Contractors Org. Capability	Identify skill gaps of **Supervisor** and training requirement to close the gaps (supervisory training).	Number of agregate training completed	number of personnel/year	2	1	2	3
	Certify technician as people in charge (PIC) to do maintenance works	Number of maintenance modules completed	number of personnel/year	2	1	2	3
	Enhance skill and knowldege of operators	Number of SOP modules completed	number of personnel/year	1	0	1	2

For people development, the focused is to enhance skill of Supervisors, technicians, and operators through training. This important as this is the foundation for contractor in delivers its performance.

5. Discussion and Recommendations

The performance management system developed by PT. XYZ for its chemical contractor is much better than the reporting system applied before. A comprehensive success factors and its metrics has captured most of company's objectives and

strategy. It is enabling the company to review contractor' performance thoroughly and also enable the contractor to improve its performance to meets both the company and contractor objectives. It is also enable the company to decide whether the contractor is performed or not as basis for contract extension, termination, and also as a consideration for next contract development. The scorecard focus is not on financial perfective, but mostly on non-financial. It can be seen from weighting that the focus of the chemical contract services is on contractor performance in term of World Class Operation and Safety, and less focused on financial objective.

However, on this performance management system there are still some weakness found and need some continuous improvement for better system. Some weaknesses analyzed are as follow:

a. Weighting system seems not balanced between objectives. The weighting portion for each objective as follow: Incident Free Operation: 23%, Capital Stewardship: 4%, World Class Operation: 64%, Continuous Improvement: 4%, and People Development: 5%. It can be seen a far range of weighting between World Class Operation and Incident Free Operation with another objectives. Less weighting portion to Continuous Improvement and People Development seems does not support the linkage and inter correlation between perspectives on the balanced scorecard.
b. People Development metrics still focused on traditional factors such as number of training, number of certification and number of SOP completed. It is not focused on quality of trainings and certification and also skill improvement of the employee.
c. On Safety objectives, some metric still using traditional factors such as number of management visit, number of inspection, number of training, and number of observation.
d. On Continuous Improvement objective, the metrics is only focus on number of project and improvement, not focus on the quality of the improvement.

To improve the performance management system, some recommendations below can be considered:

a. Rebalanced the weighting by increase the portion of people development and continuous improvement. Some metrics also should be modified, for example number of safety observation can be change safety audit score, so the score is to be more quantitative.
b. Encouraged the contractor to invest more money on people development by increase the quality of training in sampling, analysis, and chemical performance knowledge.
c. Encourage contractor on company commitment on safety and operational excellence, especially to its management level.
d. Encourage contractor in continuous improvement by not only focused on number of improvement but on the quality of improvement and lean sigma projects, for example increase quality of oil and water product and Cost of Poor Quality for lean sigma project.

e. An audit should be conducted regularly to verify the data provided by contractor especially on safety and operation performances by check any safety record and documents, audit operator skill, and validate operational data.

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