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A Proposed Design of Project Performance Measure for Solid Hazardous Waste Utilization Project at Oil and Gas Company – PT. XYZ

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Abstract - **For more than 90 years, PT. XYZ (Company) has been explore oil and gas in Indonesia. Beside oil production, waste also produced and its processed to meet the regulatory compliance. Red brick utilization is selected processing method for solid hazardous waste.**

Performance Management System (PMS) implemented on Company operations.Current Company PMS designed by functional basis. The functional PMSmeasure services performance; Health, Safety & Environment (HES) Performance and Quality Assurance.

A systematic assessment on current PMSconducted by Integrated Performance Management System (IPMS) framework. The IPMS frameworkintroduced by Wibisono, D., (2016). Signal Detection Theory (SDT)used on validating performance variables. Performance variables clustered as true signal and noise.

There are 12 of performance variables identified. 9 performance variables are identified as correct selection, 1 performance variable identifies as gap, and 2 performance variables identified as correct rejection. The identified performance variables weighted and formulated for scoring system and dashboard.

The success criteria of project performance measure are right on target, valid, reliable, specific, and acceptable.

Keywords - **Integrated Performance Management System, Project Performance Measure, Solid Hazardous Waste Utilization.**

I. INTRODUCTION

Oil and gas as one of energy resource, become the primary demand for providing the needs of energy on earth. It has more than the need of industrial growth, but needed in all aspect of human life. Fuel as one of crude oil product has variety of utilization.Fuel consumption for transportation utilization is highest proportion with 88% of total fuel consumption in Indonesia (Ahmad Amir, 2018:13).

For more than 90 years, Company leading on energy exploration in Indonesia. Company unlock Indonesia's energy potential through innovation, explore new oil fields.The crude oil production start from oil well and pumpedthe crude oil to the gathering station for separation and purification. Produce water produced from separation process at gathering station and collected at tanks. Crude oil pumped to tank farm for shipment stockpile. Then crude oil loaded to vessel for export. The simplified flow chart of this process as on fig 1.

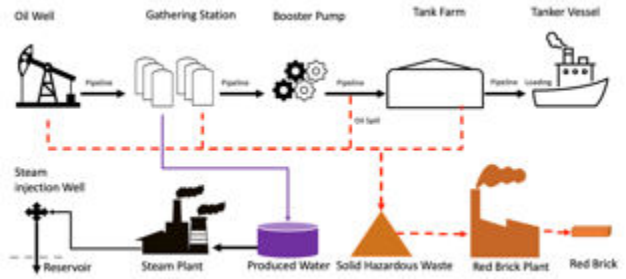

Fig. 1 Oil Production and Waste Produced

Fig. 1 describe that produce water associated with crude oil recycled. Produced water collected and converted to steam for steam injection. The steam increase crude oil temperature and lowering the viscous of crude oil at reservoir. Lighter crude oil viscous increase crude oil production.

During the oil production process, unintended crude oil contamination are occurred. The crude oil contaminated well pad (soil), road, or any surrounding of oil storage tank. The contamination cleaned up by mechanical excavation and collected as solid hazardous waste. The solid hazardous waste shall be processed by proper technology and comply to government regulation.

One of approved processing methods for solid hazardous waste is solidification. Solid hazardous waste converted to red brick. The red brick produced is common red brick for building construction. Red brick utilization selected as one of effective methods for solid hazardous waste treatment. This process are initiated as project and managed through the project management.

Red Brick utilization project become one of major solid hazardous waste project atCompany. The productivity and capacity of processing getting higher. Resources on manpower, capital and system deployed on the project. in order to manage this project, PMS implemented.Company implement established PMS to measure to project performance, Company organization performance and contractor service performance. Three major functional performance measure implemented, they are:

1) Service Performance

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2) Health, environment & Safety Performance
3) Quality Assurance

All three functional performance measure organized by three different system, three different department in different time schedule of assessment.

Company organization or team and contractor become the subject measured. The measurement assessment does not considering specific project deliverables. Current performance measure measured common requirement of the project execution. The project performance did not accommodated project deliverables.

II. LITERATURE REVIEW

A. *Integrated Performance Management System (IPMS)*

After three performance management framework literature researched; Performance Prism, Balanced Scorecards & Integrated Performance Management System, author compared those tools into the problem statement define on this research.

Performance Prism is one of the performance management framework that has developed to have flexibility on adopting both broad and narrow focus of performance measure design. Performance Prism has five interrelated perspectives that support the performance and its specific vital question (Neely, A. 2002:160):

1) Stakeholder Satisfaction – who are our key stakeholder and what do they want and need?
2) Stakeholder Contribution – what do we want and need from our stakeholders on reciprocal basis?
3) Strategies – what strategies do we need to put in place to enable us to execute our strategies?
4) Processes – what processed do we need to put in place to enable us to execute our strategies?
5) Capabilities – what capabilities do we need to put in place to allow us to operate our processes?

All five perspectives provides a comprehensive and integrated framework on determining corporate performance. The interrelation among capabilities, strategies and process are collaborated to deliver stakeholder satisfaction which also provide the feedback as stakeholder contribution to the overall corporate performance.

Balanced Scorecard (BSC) is one of corporate performance management framework that commonly used by firm. Balanced scorecard also used as a framework by researcher on developing specific corporates performance management system. Balanced scorecard measure the corporate performance on four perspectives: financial, customer, internal process, and learning & growth. The financial target become the primary initiated then other factor discovered to become determined as performance measure. The Limitation of BSC are:

1) BSC approach only limited to four perspectives, in fact, there may be any other perspective to be measure, e.g. community development.
2) BSC measure the performance in four perspective base on the performance achieve without provide any suggestion to be done for better performance.
3) BSC concept has vague approach to control organization output, there is set of standard or benchmarking for each perspectiveobjective.

The comparison of BSC, Performance Prism and IPMS are cited from Wibisono (2012) described below:

TABLE 1–BSC, PERFORMANCE PRISM & IPMS COMPARISON
SOURCE: WIBISONO 2012

Aspect	BSC	Performance Prism	IPMS
Design Procedure	Clearly stated	General overview	Clearly stated
Performance variable formulation	General overview, supported by detail formula in its implementation	Detail formulation for each variable	Detail formulation for each variable with and intercorrelation with other
Number of variables	Categorized into 4 major perspective	More than 200 individual performance variable	Divided into three major performance which is inter correlated
Relation between variables	Described in available perspective	Clearly distinguished	Specifically describe in aspect of relationship between variable

According to PMS Framework described above, conventional system is not enough to focus only in financial matters. Wibisono (2006) explained the drawbacks of conventional PMSmight irrelevant, tend to report past performance, short-term oriented, less flexible, does not foster any improvement, often ambiguous in cost aspect. IPMS framework has several advantages as mentioned below (Wibisono, 2012):

1) Provides simple and structured approach which focus to process and result.
2) Supports stakeholder to determine strategy, target and evaluate all together.
3) Provides potential system to measure performance fairly in terms of role, responsibility and reward determination.
4) An excellent framework to determine accountability.
5) Divides responsibility to all parties to improve performance.

IPMS has been found to resolve ambiguity of PMS by aligning all company performance perspectives both financial and non-financial with clear benchmarking and performance standard. Business objectives and

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uniqueness accommodated on PMS as part of IPMS strength.

Integrated performance management system (IPMS) is a chosen as framework to develop the performance management system at PT Pos Logistik Indonesia due to its advantages of simplicity design, yet its complete nature to facilitate the stakeholders' needs (Firstyani, 2016). IPMS framework combines the simplicity of the BSC and takes into account all stakeholders such as Performance Prism. This framework can also be used for non-profit organizations because performance indicators are not only focused on financial factors (Yuliharyani, 2020). IPMS (Integrated Performance Management System) method was chosen as a performance management framework to be designed at PT KeretaApi Indonesia (Persero). IPMS is believed to be easily understood by the employees in the company(Ravenska, 2019).

Learning from current business situation at Company, the first problem on current PMS is high complexity and multisystem supported the PMS. There are 3 separated systems conducted in 3 different schedule of performance measure assessment. The integration of those systems demanded. Simplified of performance management system is required. The second problem is current performance management system did not address specific project performance deliverables objectives. This situation drove the company to have more specific performance measure system that measure project performance right to the target. The development of project performance measure become essentially required to support project deliverables.

Responding to the problem statement, author identified that IPMS is the best framework to resolve problem. IPMS has three perspective with eight aspect that potentially used for project performance measure. IPMS concept developed for the corporate level performance management. There are similar perspective and aspect that could be implemented in the project. the simple comparation are shown on table 2.

TABLE 2 - IPMS AND PROJECT DELIVERABLES COMPARISON
SOURCE: AUTHOR

IPMS Framework		Proposed PMS
Perspective	Aspect	Project Deliverables
Organizational Output	Financial	Project cost
	Non-financial	Project stakeholder acceptance
Internal Process	Innovation	Project innovation
	Operation process	Project execution
	Marketing	Project buy in
	After sales service	Project close out and Compliance Reporting
Resources	Human resources	Project hiring and assignment
	Technology Resources	Project execution technology alternatives
	Organization Resources	Project team and support organization

The Integrated Performance Management System (IPMS) introduced by Wibisono, D., (2014). The IPMS design the performance management based on the company core business and competencies.IPMS framework has comprehensive coverage on framing performance management with detail performance perspective and aspect. The detail of IPMS perspective and aspect are shown on Table 3.

TABLE 3 - IPMS PERSPECTIVE AND ASPECT
SOURCE: WIBISONO, D., 2016

Perspective	Aspect
Organization Output	Financial
	Non-Financial
Internal Process	Innovation
	Operation
	Marketing
	After Sales Service
Resources Capability	Human Resources
	Technology Resources
	Organization Capability

In table 3, there is organization output that consist of financial and non-financial aspect to be measured on the performance management. The IPMS framework also measure the Internal process, that support the Organization output. There are Innovation, Operations, Marketing and After Sales Service. Another Perspective that support of Organization output is Resources Capability that consist of Human Resources, Technology Resources and Organization Capability.

There are typical mistake on developing Performance Management System,Wibisono, D., (2016:75):

1) Unidentified of Critical Performance variable
2) Too many Performance variable managed
3) Unimportant Performance variable presented
4) Improper Performance variable Prioritization
5) Performance variable is difficult to measure and implemented
6) Priority bias on the improvement focus versus vs sustainability.

IPMS Framework used on reframing current company performance management system started from the company vision, mission, strategies and the objective of project deliverables. The performance variable of project performance reidentified by IPMS perspective and aspect. The selected performance variable verified and formulated by Signal Detection Theory (SDT). The level of important and effectiveness of performance variable measured and weighted based on the respondent statistics.

B. Signal Detection Theory (SDT)

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The second theory used in this research is Signal Detection Theory (SDT). SDT introduced by Gustav Fechner (1966), then Heeger, D (2003:2) describe that signal detection used for decision making on the uncertainty condition present. The starting point for signal detection theory is that nearly all reasoning and decision making takes place in the presence of some uncertainty. (Heeger, 2003:1). The essence of the technique is to compare the item whose improvement managers regard as importance for the long-run success of their companies, versus the performance measure that are linked to those items (Schmenner, 1993:58).

Signal Detection theory help decision maker with precise language and graphic notation for decision analysis on uncertain condition. In this research, signal detection theory will used to predict the true signal on determining the correct performance variable to be measure. The SDT define four cluster of analysis result as below:

1) Hit; this is correct decision that there is signal and there is a signal
2) Miss/Gap; there is signal but not decided as signal
3) Correct Rejection; there is no signal and decided no signal received.
4) False Alarm; there is no signal but decided are signal received.

In simple graph on Fig. 2, there will be 4 cluster preserve to identify the performance variable assessed. Each cluster representing the level of important and effect of performance measure for improvement.

Condition	Decision	
	No Signal	Signal Present
Signal Present	Miss/Gap	Hit
No Signal	Correct Rejection	False Alarm

Fig. 2. Signal Detection Decision Cluster

The SDT will synthesis the performance measure into four cluster by measuring the level to Extend to which long-run improvement is important and Effect of Current performance measure on performance improvement. Both focus of analysis are collected from respondent feedback. The respondent feedback will be mapped to the cluster as fig.2.

III. METHODOLOGY

The research methodology designed by step by step process adopting IPMS stages. The methodologydescribed on fig. 3. The step by step research process defined to ensure that each stages has appropriate data analysis before continuing to the next step. It is sequential process and used as roadmapon research.

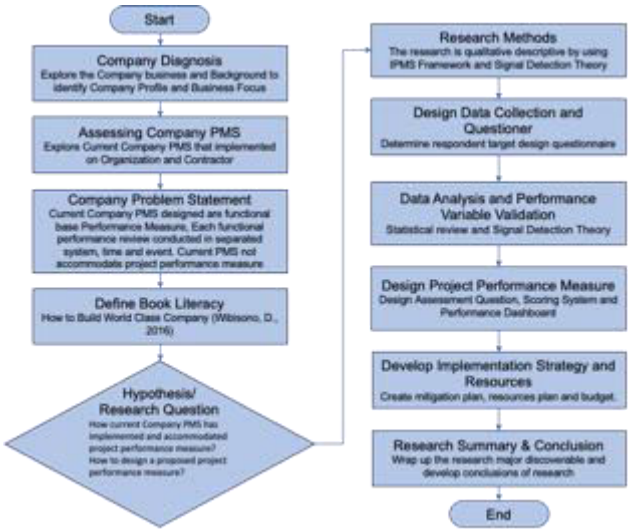

Fig. 3. Research Methodology

In fig. 3, The first step of research is learning and understanding company business and background. This activities called Company Diagnosis. Understanding company conducted by involved in the company business activities. In this case, author as employee of company that worked and observed how company conducted the business. Communication among company and employees set up company vision and mission cascaded down to entire involved employees, contractor and any other stakeholders.

The second step is assessing company PMS. As the part of company organization, author collected data on how Company PMS designed, reviewed and implemented in the organization. The Company PMS also implemented to contractor who works for Company. All system available on current Company PMS analysed and recorded as a baseline design.

The third step is develop Company Problem statement. Based on author experience on reviewing contractor performance, current company PMS strength and gap identified&analysedfor project PMS designed. The analysis conducted aftertwenty times of contractor performance assessment conducted at Company.

In the fourth step, in order to have better basic theory of the PMS, The book titled “How to Build World Class Company” written by Wibisono, D., (2016) has been used as reference framework for establishing effective PMS.

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The new design of Project PMS has been guided by the IPMS Framework.

The fifth step is creating Hypothesis. Hypothesis is important step to ensure that research focused in correct path. The hypothesis question help author to do the research within the research objective.

The sixth step is determining Research methods. IPMS framework used on re-mapping company PMS. New project PMS developed by IPMS development phase. It start from stage 0 to stage 4. current company PMS review has started from stage 0 up to the completion of new project performance management at stage 4.

The seventh step is design data collection and questionnaire. The questionnaire structured developed by implementing Signal Detection Theory (SDT). SDT expected identified the level of performance variable important and the current performance measure effect to the performance improvement. The feedback from experienced and authorized person within company received and statistical formulated.

The eighth step is data analysis and performance variable validation. After statically data collected, data validation verified by SDT. The statistics summary plotted into the graph for the level & priorities identification. SDT defined the real signal and noises. There are four category resulted by SDT, True Signal, Gap, Correct Rejection and False Alarm.

The nineth step is designing new project PMS measure.Identified Performance Variable sorted and weighted based on SDT analysis result. Formulation and scoring system developed into assessment question. Assessment question lead the performance accessor measuring project performance. Performance Dashboard designed on illustrating the performance assessment result. Performance dashboard also utilized as communication tool to project stakeholders.

The tenth step is Develop implementation strategy and resources. The implementation strategy defined major milestone, risk and develop mitigation plan. Major milestone of implementation identification defines as critical deliverable on project PMS implementation. Risk identified as major potential fail on major milestone. Mitigation plan developed to minimize or eliminated potential fail. The implementation of project PMS require resources and budget for implementation Project PMS.

The last step is research summary & conclusion. The key step and created design briefed as the result of research. Conclusion defined on what current PMS look like and project PMS created. Recommendation on developing and implementing Company PMS are delivered as consideration for improvement to Company management.

IV. (EXPECTED) FINDINGS AND DISCUSSION

A. Questionnaire Design and Result

In this research, questionnaire used as survey tools to collect respondent perspective on red brick utilization project performance variable. Respondent expected to provide two major feedback on the performance measure:

1) Performance variable importance to be measure for the Company long run improvement. In other word, selected performance variable need to be retained for long term performance improvement. In this assessment respondent provide feedback on how importance selected performance variable on current and future project performance improvement.

2) The effect of current performance measure support performance improvement. The respondent feedback expected to provide understanding how selected performance variable support project performance in current performance measure. respondent expected to provide feedback on performance variable available on current performance measure contribute to the project performance improvement.

Both assessment focusfeedback from respondent collected and summarized as mean value of it level of important. The range of assessment point is start from zero to ten, which zero mean less important and 10 as most important. The respondent feedback shown on table 4.

TABLE 4.PERFORMANCE VARIABLE EXTEND TO WHICH LONG-RUN IMPROVEMENT IS IMPORTANT

Performance variable	Mean	Standard Deviation
Operation Compliance Assurance	9,67	0,49
Stakeholder Acceptance	9,67	0,65
Operations Safety	9,08	0,79
Processing Cost	9,08	1,08
Product Quality Assurance	8,58	1,08
Process Capacity, Capability & Flexibility	8,17	0,72
Process Innovation	7,58	1,73
Human Resources Management	7,08	1,62
Organization Capability	6,92	1,16
Community Development	5,50	4,17
Technology Resources	4,50	1,00
Product Marketing	1,33	2,46

Respondent has provide the second focus of research, Effect of Current performance measure on performance improvement as shown on table.5. The range of assessment point is start from zero to ten, with zero mean least effective and ten as supportive performance variable.

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The respondent feedback summarized as shown on table 5.

TABLE 5.PERFORMANCE VARIABLE EFFECT OF CURRENT PERFORMANCE MEASURE ON PERFORMANCE IMPROVEMENT

Performance variable	Mean	Standard Deviation
Operation Compliance Assurance	8,42	1,98
Operations Safety	8,33	1,97
Product Quality Assurance	8,17	1,85
Stakeholder Acceptance	7,83	2,33
Processing Cost	7,42	1,88
Process Capacity, Capability & Flexibility	7,00	1,76
Process Innovation	6,67	1,56
Organization Capability	6,33	1,37
Human Resources Management	5,25	1,14
Community Development	3,75	3,02
Technology Resources	3,42	0,79
Product Marketing	0,75	1,42

When Combining two assessment focus into two axis X & Y, "Effect of Current performance measure on improvement" represented by X axis and "Extend to which long-run improvement is important" represented by Y axis. The mean value of respondent feedback plotted to the SDT diagram for node position. There are four cluster defined on the SDT diagram: Hit, Miss/Gap, Correct Rejection and False Alarm. Each cluster range define from 0 to 5 and 5 to 10.

All node plotted to the diagram define each performance variable definition by SDT as shown on fig. 4.

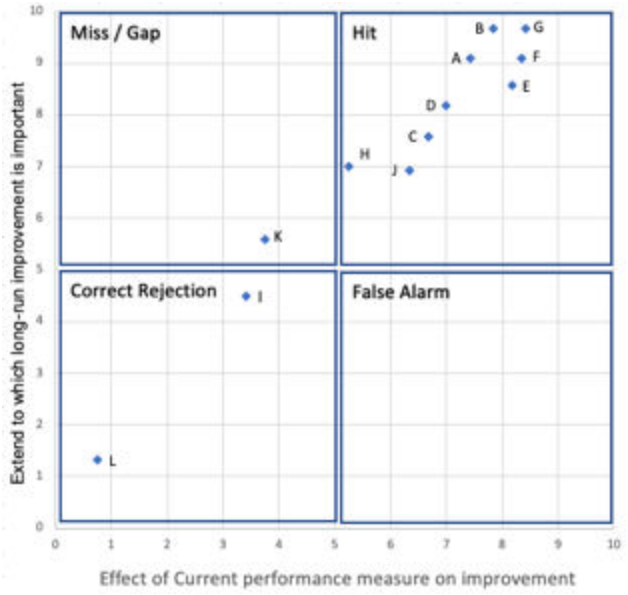

Fig. 4. Performance Variable Measure Plotting

On the fig. 4, Node A, B, C, D, E, F, G, H and J plotted on hit cluster, means that those performance variable are "Hit" or correct selected as right performance variable to be measured. Node I and L are plotted on "correct rejection" cluster, means that I & L are not required to measured. Node K was plotted on "Gap" cluster means that this performance variable is important, but not effective in current performance measure.

Based on SDT analysis the 12 performance variable defined as shown on fig. 5.

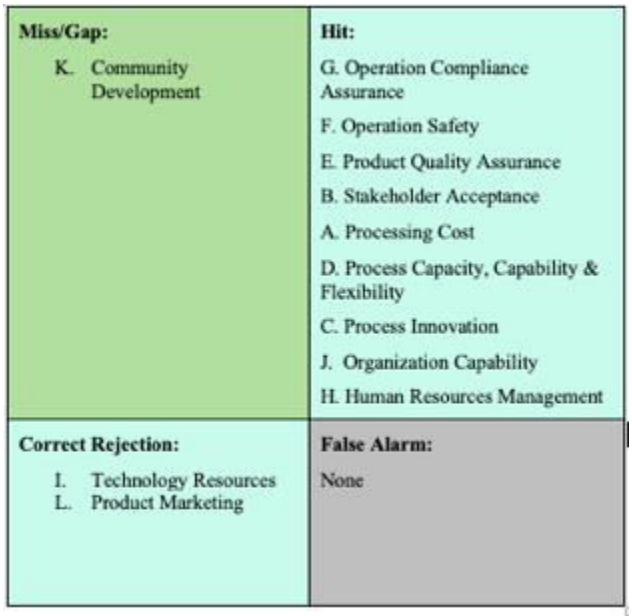

Fig. 5. Signal Detection Analysis for Performance Variable Measure

Based on plotted summary on fig. 5, Technology Resources and Product Marketing performance variableswere plotted as correct rejection, meaning those performance variable eliminated from the project performance measure.

B. Design of Project Performance Measure

Scoring criteria is important stage on developing project performance measure. The scoring criteria provide guide to project sponsor on determining the performance score for each performance variables. The scoring criteria also reduce bias on determining the criteria of success. Performance criteria convert the performance quality or quantity into score. The highest achievement defined by 100 score and the lowest scored by 0. There are two types of scoring criteria:

1) Binary score, the score is only gain into 2 condition, accepted or not. This conditions applies to scoring criteria for compliance requirement or legal requirement. The example of binary score is processing facility permitting that mandatorily is requiredby legal

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aspect. The score define is binary, 0 or 100, there is no middle score that possible for this condition.

2) Distributed score, the score distributed into three level of adequacy. The highest level is for fully meet requirement, the mid-level of score is falls short below requirement and the lowest score is poor performance. Distributed scoring system measure variousachievement level.

Each performance variable determine into several assessment question that representing the deliverables. Assessment question help assessor to catch performance variable factor that contribute score to the performance. The assessment question example are described on Table 6.

TABLE 6. PERFORMANCE VARIABLE MEASURE SCORING CRITERIA

Assessment Question	Scoring Criteria (Score)		
Objective: Operation Compliance Assurance			
1)Solid Hazardous Waste Source and Properties Analysis	**Not Available (0)**	**Available (100)**	
2)Waste Code identification, definition & Labelling	**Not Comply (0)**	**Comply (100)**	
3)Storage, mass balance and leachate management	**Not Comply (0)**	**Comply (100)**	
4)Solid Hazardous waste handling, transportation and manifest	**Not Comply (0)**	**Comply (100)**	
5)Processing Facility Permitting	**Expired (0)**	**Valid (100)**	
6)Certificate of Treatment (COT) and Reporting	**Not Available (0)**	**Available (100)**	
Objective: Operation Safety			
7)HES Plan on the project implementation is mandatory required as a baseline to set incident prevention and identified as a guide on performing incident free operations.	**Not Available (0)**	**Available but not meet KPI target (50)**	**Available and meet KPI target (100)**
8)Safety Leading indicator is important aspect that contribute to the incident prevention. The Safety Leading Indicator KPI achieve target	**Not Available (0)**	**Available but not meet KPI target (50)**	**Available and meet KPI target (100)**
9)Safety Lagging Indicator as one of the safety performance measure as actual safety performance. the safety lagging indicator KPI achieve target	**Not Available (0)**	**Available but not meet KPI target (50)**	**Available and meet KPI target (100)**

In table 6, Each performance question has to be answered by project team reviewer or project sponsor based on the evident provided. Each evident provided compared to the scoring criteria for scoring result. Each scoring result are compiled and calculated as a contributor to each performance variable according to the weighing and calculation method.

The scoring weighted by weight factor that representing the priority of score of each performance variable. The weight factor purpose is prioritization of performance variable based on the vector length of node plotting. Table 6 show the calculation of vector length for weighted factor on performance variable scoring system.

Table 7. Determining Scoring Weight Factors

Performance variable	X Axis	Y Axis	Vector Length	% Weight	Round up/down
Operation Compliance Assurance	8,42	9,67	12,82	11,99%	12%
Stakeholder Acceptance	7,83	9,67	12,44	11,64%	12%
Operations Safety	8,33	9,08	12,33	11,53%	12%
Product Quality Assurance	8,17	8,58	11,85	11,09%	11%
Processing Cost	7,42	9,08	11,73	10,97%	11%
Process Capacity, Capability & Flexibility	7,00	8,17	10,76	10,07%	10%
Process Innovation	6,67	7,58	10,10	9,45%	9%
Organization Capability	6,33	6,92	9,38	8,78%	9%
Human Resources Management	5,25	7,08	8,82	8,25%	8%
Community Development	3,75	5,50	6,66	6,23%	6%
			106,87	100,00%	100%

The determined weighing for each Performance variable has defined and decided as percent on the performance measure contributor.The performance measure result will proportionally calculated with the weight factors. This weight factor address the level of priority of Performance Variable Measured.

Table 6 calculated vector length (points) for each performance variables, the X axis and Y axis point calculated with equation (1)

$$Z = \sqrt{X^2 + Y^2} \quad (1)$$

Definition:
Z = Vector Length (points)
X = X axis (points)
Y = Y axis (points)

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In table 7, the vector length summary has 106.87 distributed in proportion to the performance variable. The vector length has define as the priority of performance variable. The percentage resulted from vector length converted to percentage of performance variable weight factor. Thus, each performance variable contribute in proportion to the total performance measure.

One of important tools on controlling the project performance is performance dashboard. The Performance dashboard compare current performance versus baseline target. Management use dashboard to identify the execution gap and alignment.

The dashboard onperformance variable measure has designed to measure the contribution of performance variable to project success. Each performance variable score achieved displayed on dashboard. The dashboard unit of measurement is in percentage of performance. the 100% score means highest achievement.

Dashboard shown on Fig. 6 provides information to project stakeholder on project performance gap. The action plan created by project sponsor to improve project performance.

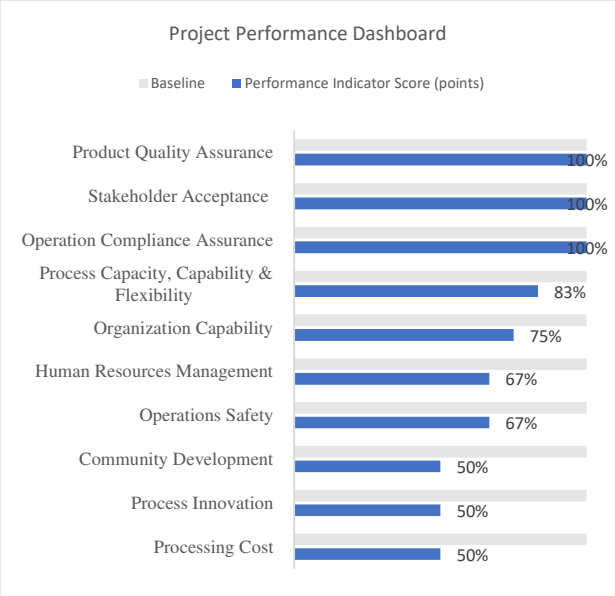

Fig. 6. Example of Performance Dashboard

The performance dashboard used by project team and sponsor to understand project performance, take any decision or strategic change,and align project execution plan.

IV. (EXPECTED) FINDINGS AND DISCUSSION

Successfully project performance implementation identified by smooth transition of PMS changes. Company expect all PMS changes has less impact to the operation. The success criteria of successfully project performance measure is:

1) Right on target: Project performance measure effective to address all project deliverables objective. The project performance measure explore accurate performance variable that support project deliverables.

2) Validity: Project performance measure assess all relevant portion of performance variable, it should appropriate, proportional, does not lacking or grimy.

3) Reliability: Project performance measure has right stability and conciseness. The performance variable defined on performance measure has accommodated project deliverable dynamic.

4) Specificity: Project performance measure provide detail scoring systemand lead by assessment question.

5) Acceptability: Project performance useful and adequate to measure project performance. the magnitude of assessment question validated, achievable and realistic.

In order to achieve all success criteria, the project performance measure implementation takes time and effort for enhancement. The project performance measure is not a rigid tools, it can be align with the project dynamic. At least, the success criteria used to examine the project performance measure fitness.

A proposed red brick utilization project performance measure, all functional PMS combined into one project performance measure. all functional performance target adopted and formulated into single system with more focus on project deliverables. The benefit of this changes are described on table 6.

1) Accurate; Project performance measure designed base on project deliverable objectives and considering performance variable prioritization.

2) High Impact; Project base performance measure adopting all project deliverables and objectives.

3) Effective; Project performance measure conducted once for all functional focus PMS with single system. There are smaller number of resource and time allocated.

4) Agile; Project performance measure has been built base on specific service and project deliverables.alignment or adoption of assessment question is not required.

5) Integrated; Project performance measure result representing all project aspect.

6) Communicated; The result of project performance measure well communicated to all parties involved in the project in seconds by performance dashboard.

7) Collaborated; The project performance measure encourage cross functional team collaboration on the assessment.All functional team accommodated on single system.

8) Time saving; The Project performance measure

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assessment conducted once for all functional PMS. It was simplifiedand shorted on the assessment.

9) Lower Cost; Cost for project performance measure is investment. Despite the cost of establishment is required, it will earn the benefit by providing high project performance & deliverables.

10) Performance Focus; Project performance measure focus on the performance result. Correct performance variables ignored the assessment bias.

V. CONCLUSION

Integrated Performance Management System which introduce by Wibisono, D., (2014) is used as basic framework for designing project performance measure. The IPMS framework measure organization output, internal process and resource capability perspectives. By IPMS framework, author define 12 performance variables.

Twelve performance variables founded are validated by Signal Detection Theory (SDT) to identify the real signal and noise. There are 9 Performance variable identified as correct signal, 1 performance variable as gap and 2 performance variables as correct rejection and none of them identified as false alarm.

Ten performance variables were defined as extended to which in the long run improvement important and effective on current performance measure for improvement. Ten performance variable weighted and scored. performance assessment question developed to minimize bias. Dashboard communicated the project performance to project team and stakeholders.

Proposed project performance measure for red brick utilization has designed more effective on performance improvement and support project deliverables. It is much better than current Company functional PMS. The performance measure integrated service performance, HES performance, and quality Assurance into single project performance measure.

Implementation strategy is important on project performance measure implementation. The milestone, constrain and mitigation identified in early plan to response uncertain situation.

Criteria of success for a purpose project performance measure reviewed by Right on target, validity, reliability, specificity and acceptability. The criteria of success also used for simulating project performance measure fit for purpose.

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