DEVELOPING PERFORMANCE MANAGEMENT SYSTEM WITH BALANCED SCORE CARD APPROACH: A CASE STUDY OF PT. SMART-MODULAR BUILDING INDONESIA

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Abstract

Performance Measurement System (PMS) is essential for any organization, as it serves as guiding compass for continuous improvement. The research is a case study in a modular concrete company refining their current PMS using Balanced Score Card approach. The research developed Balanced Score Card (BSC) starting from the whole company level.The high level KPIs used input combination from literature studies, existing KPIs and project/Customer feedback. Proposed high level KPIs were then finalised using affinity diagram workshop with relevant stakeholders. They were then cascaded down into 3 main company activities, design, supply and construction. Measurement for 1st quarter of 2019 was done, and target and action plans for each activity were also set for the studied company.

***Keywords**: balanced score card, key performance indicators, performance measurement system,*

INTRODUCTION

Supply chain management is the whole processes and activities involved from suppliers up to consumers. It involves value added activities in converting materials into finish goods as well as storage and distribution. Through the whole process, it is essential to measure performance in order to optimize cost, enhance customer satisfaction and increase profitability (Pujawan, 2005).

Performance measurement system (PMS) is crucial in order to increase organization success. An effective PMS can translate organization strategy into desired behaviours and results through effective communication on expectations, monitoring progress, give feedback and motivate employees (David and Joseph, 2014)

As with others, construction industry also needs performance measurement mechanism in its supply chain. Construction industry's final product varies from buildings, civil works, infrastructure works, etc. Its activities include planning, scheduling, installation and deinstallation or even refurbishment (Andriani & Sarah, 2017). Nevertheless, construction can be considered as high risk due to complexity in its supply chain. To some extent the complexity increases due to number of involved stake holders and market pressure (O'Brien, London, Vrijhoef, 2002).

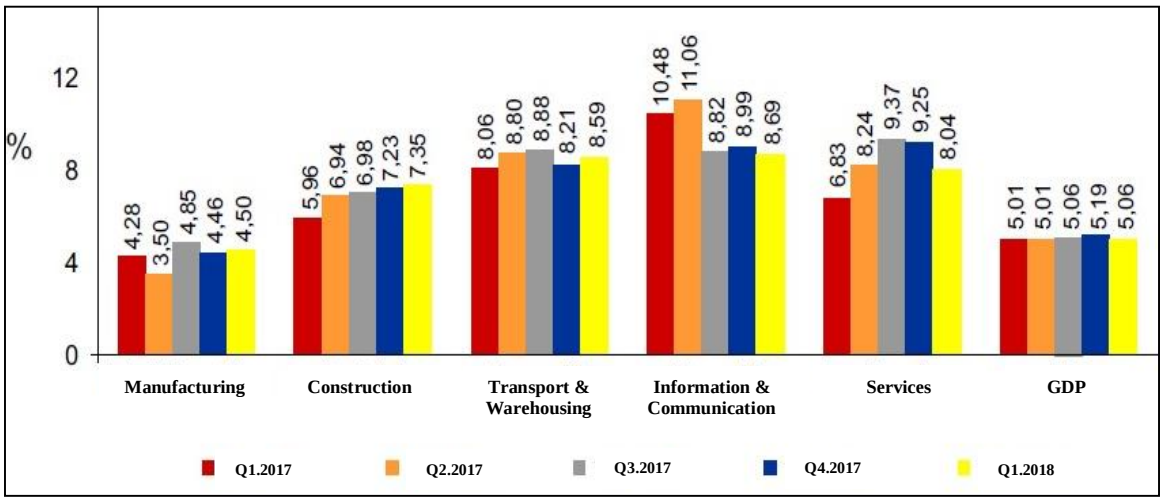


Figure 1. Economic Growth by Sector (in GDP)
Source: (www.kemenperin.go.id, 2018)

Research from previous studies indicated that in 2001, about 44% of companies world-wide has adopted BSC framework, which consisted of 57% in UK, 46% in USA, 26% in Germany and Austria. Research by Bain & Company also shown that from 708 companies around the globe, 62% of that has embraced BSC (Hendricks, Wiedman, & Menor, 2004). Indonesia construction sector enjoys healthy growth of 7-8% due to increasing demand in property and housing in big cities as indicated in Figure 1. Detail data in Table 1 shows growth of ~5% for overall construction value in 2017, with biggest contribution in Building sector.

The research is a case study at PT Smart Modular Building Indonesia, an Engineering, Procurement and Construction (EPC) company in Indonesia. The company already has a PMS in place. Although the current PMS already has both financial and non-financial aspect, it lacks the framework for continuous improvement. Therefore, it was exploring to enhance the existing ones with a more systematic and complete PMS. It also needs to install framework for KPI monitoring (i.e. set target and action plans) for continuous improvement. The objective of the study is to assist the studied company refine its PMS into BSC framework, by reassess their required KPIs, perform current measurement, set target and action plans to close the gap towards the target. The PMS was done from whole company level and was cascaded down into 3 main activities of the company, i.e.: design, supply and construction.

LITERATURE REVIEW

Performance Measurement System (PMS)

Performance indicators are assessment against a process with the objective to measure against certain target. In a nutshell, performance indicators are measurement process against effectiveness and efficiency against activities in organization (Taticchi, Tonelli and Cagnazzo, 2010; Frederico, & Martins, 2014)

Performance Indicators is measurement in quantitative or qualitative terms which assess performance level against target (Abdullah, 2014). Moeheriono, (2012) set the following definition for performance indicators:

Table 1. Construction Index and Growth

Description	Quarter 2016		Quarter 2017	
	III	IV	I	II
(1)	(2)	(3)	(4)	(5)
Workers	117,35	118,12	117,19	118,21
Growth	0,97	0,65	-0,78	0,87
Man-days	196,46	205,09	200,70	209,57
Growth	2,61	4,40	-2,14	4,42
Wages and Benefits	203,34	213,22	208,83	219,07
Growth	2,83	4,86	-2,06	4,90
Construction Value:	209,50	219,56	214,44	224,50
Growth	2,74	4,80	-2,33	4,69
- **Building Construction**	210,96	216,42	210,81	222,94
Growth	2,10	2,59	-2,59	5,75
- **Civil Construction**	259,73	274,30	268,29	281,62
Growth	3,01	5,61	-2,19	4,97
- **Special Construction**	208,91	213,28	206,35	214,81
Growth	1,69	2,09	-3,25	4,10
Business Prospect	53,59	52,49	58,10	58,26
Business Condition	56,64	51,37	51,28	54,61
Business Problems	27,25	29,06	27,62	27,43

Source: www.bps.go.id

1) Performance indicators are value of certain characteristics used to measure output of an activity
2) Performance indicators are measurement tools that can be used to assess success rate of certain organization in achieving its objective.

According to Moeheriono (2012), performance indicators can be distinguished into 6 measurement, which each organization can developed according to their mission, i.e.:

1) Effectiveness of its process in delivering its objective
2) Efficiency of its process to deliver outputs with as minimal cost as possible
3) Quality of its product as per consumer expectation
4) Timeliness of the finished work
5) Productivity of the organization
6) Safety for the organization and its environment

Iveta (2012) stressed the key elements when implementing PMS is ability to distinguish strategic measurement against ordinary measurement. Setting incorrect KPIs can damage the essence of PMS. According to (Iveta, 2012), effective KPIs are those having the following traits:

1. *Sparse:* The less variant the better
2. *Drillable:* KPI user can dig information further
3. *Simple:* KPIs are easily understood
4. *Actionable* : Users can understand KPI's usage and action against it.
5. *Owned:* KPI is owned by respected stakeholders
6. *Referenced:* Users have access to source and initial context of KPIs.
7. *Balanced:* KPIs address both financial and non-financial aspect
8. *Correlated:* KPI encourage to deliver results

9. *Aligned:* Each KPIs compliment and not destructing other KPIs
10. *Validated:* KPIs has been validated so users can not dispute finalised KPIs.

Another characteristic of effective KPIs are those following SMART principle, i.e. *Specific, Measurable, Attainable, Relevant,* dan *Time Bound*.

Balanced Scorecards (BSC)

Balanced Score Card is a well-known PMS introduced by Norton and Kaplan in the 90s. In the nutshell, BSC offers the following functions (Frederico, G F., & Cavenaghi, 2017) :

a. Measurement system
b. Strategy management system
c. Communication tool

By adopting balanced score card, measurement is done through four balanced perspective of BSC which reduce the risk of information overloaded (Kurien and Qureshi, 2011; Oey and Mulianti, 2017). The beauty of BSC is for each KPIs there should be measurement, target and action plans to close the gap. Balanced score card consists of 4 quadrants, as indicated in Figure 2 (Kaplan, R., 1992; Malgwi and Dahiru, 2014) :

1) Financial Quadrant

In this perspective, strategic recommendation and indicators related to financial performance are identified and captured. With financial perspective, investor and shareholders can measure company performance.

2) Customer Quadrant

The main objective of this quadrant to focus on organization activities that enhancing its market share, perform customer retention, increase customer recruitment, and enhance customer satisfaction

3) Internal Perspective Quadrant

This quadrant stress on three main processes, ie innovation, operation and after sales service

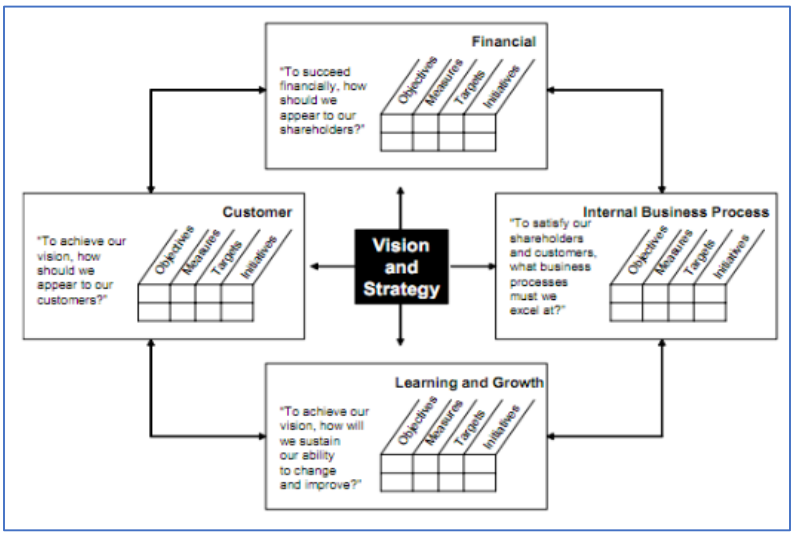


Figure 2. BSC Framework
Source : (Kaplan, R., 1996)

4) Learning and Growth Quadrant

Last but not least, this quadrant stress on capability of employees (skills, talents, knowledge and training) as well as information system, culture, leadership and teamwork. The objective of this quadrant is to increase employee capability by making sure each employee can give better service that benefit organization, and increase their motivation and alignment

BSC has the following advantageous (Malgwi & Dahiru, 2014):

a. For company with a clear vision and mission, BSC can translate this vision and mission into communication strategy with clear objective and inter-related performance indicators. BSC also accommodates continuous improvement by facilitate identification of new strategies and refinement on existing strategy towards performance.
b. BSC also assist staffs within the organization on how to contribute to strategies in his/her area.
c. BSC give direction from vision and mission of organization to performance measurement
d. Its four quadrants make BSC comprehensive, coherent and balanced

Nevertheless, BSC is also consider to inherit the following weaknesses (Malgwi & Dahiru, 2014)

a. Causal relationship in each area of BSC is too simple and one direction only
b. BSC do not take into account time dimension
c. In its internal focus quadrant, BSC do not take into account competitors
d. BSC is also considered not effective for company's sustainability

RESEARCH METHOD

The research used descriptive qualitative method. Unit analysis is PT Smart Modular Building Indonesia in its three key activities: Design, Supply & Construction. Data was collected using combination of desk research, participative observation, questionnaire, and workshop; including both primary data (customer/project feedback, grouping in workshop) as well as secondary data (existing KPIs, KPIs from literature). Grouping and finalization of KPIs was done in workshops using affinity diagram approach, where collected KPIs arranged into four quadrants of BSC in a workshop, as outlined in Figure 3. Complete research framework is shown in Figure 4.

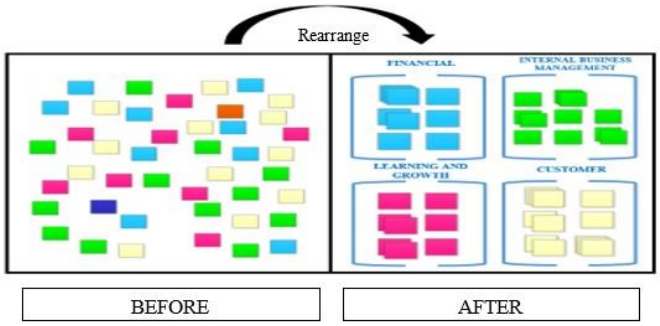


Figure 3. Affinity Diagram Workshop Visualisation

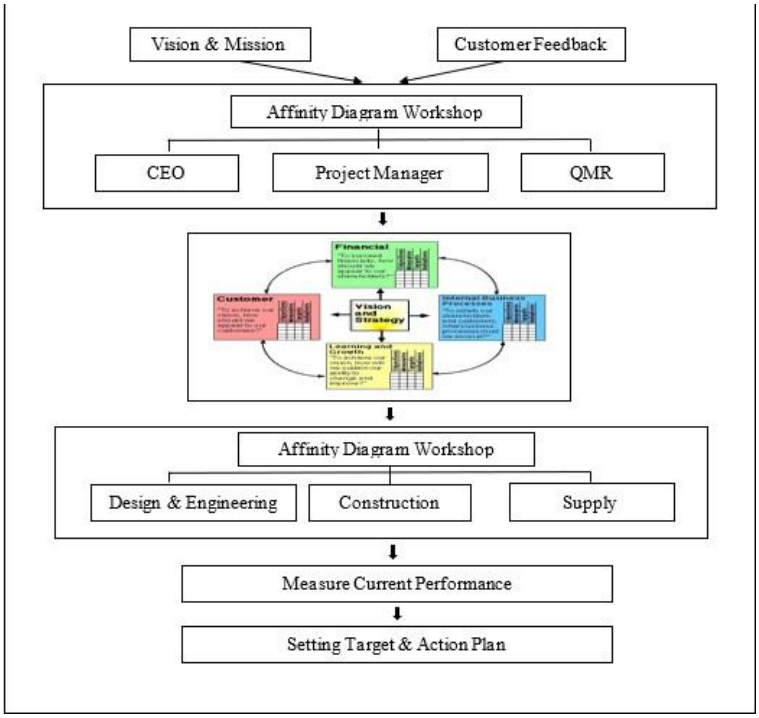


Figure 4. Research Framework

RESULTS AND DISCUSSION

Generating Top Level Key Performance Indicators

Draft of performance indicators were made using combination of literature review and questionnaires from few current projects of the studied company. Table 2 displayed KPIs from literature reviews, whist feedback from 8 experts representing customer from various projects is summarized in Table 3. Besides feedback from the key personnel, the current KPIs as outlined in Table 4 also taken into consideration.

Based on the inputs, workshop was performed in order to brainstorm possible KPIs based on BSC framework. The workshop was done with top management of the studied company (director, representative of project managers, and reps from quality management review team). The workshop was done by using affinity diagram approach. Result in whole company level is shown in Figure 4. The agreed KPIs in high level were then cascade down into 3 activities, and affinity diagram workshop were again performed.

Table 2. Construction Related KPIs from Literature Review

Performance Indicators
1. % net budget variation
2. Cash Balance : Actual vs Baseline Plan
3. Monthly schedule deviation : Contract/plan schedule vs Actual schedule
4. Actual working days vs available working days
5. Cost predictability : design and construction to rectify defect
6. Technology : number of experts and tools

Source : Authors,2019

Table 3. Proposed KPIs from Project/Customer Feedback

Respondents	KPIs	KPI DESIGN	KPI SUPPLY	KPI CONSTRUCTION
Expert 1, Engineering, Bandung project	1	Site/Location Monitoring	Material as per specification	Schedule
	2	Material Design	Approval Material	Technical Coordination
	3	Shop Drawing	Schedule Material	Approval Shop Drawing
	4	Approval Design	Material as per shop drawing	K3
	5	Site Coordination	Site Coordination	Site Coordination
Expert 2, Technical Admin, Makasar Project	1	Site/Location Survey	Material adjustment at site	Panel Installation system at site
	2	Work schedule/work progress	Permit completeness, and material approval	Attention to work detail on site
	3	System procedure applied on site	Material specification	Structural drawing approval
	4	Complete administration, material and permit	Drawing approval	Permit completeness
	5	K3 System	Test for material strength and quality	Test each work item
Expert 3, Engineering, Makasar Project	1	Technical drawing	Choice of delivery agent/transporter	Choice of main structure (strength)
	2	Location Survey & measurement	How to choose and prioritize material	Material availability
	3	Choice of suitable (finishing) material	Material Order scheduling	Installation method on site (installable or not)
	4	On-site construction and material as per drawing	On site or workshop fabrication	No disturbance to third parties during construction
	5	Addition of local content in design	Material availability during fabrication	Use of tools according to K3 standard
Expert 4, Chief supervisor, Batam project	1	Location survey	Material delay	Installation system for panel
	2	Design Material	Material completeness	Work Safety
	3	Construction method according to design	Material adjustment on site	Site coordination
	4	Material completeness	Material quality	Completeness of Construction permit
	5	Technical drawing	Site coordination on material	Usage of construction tools as per K3 standard
Expert 5, project manager, Batam project	1	Technical drawing	Material supply	Coordination between site supervisor and project coordinator
	2	Location/Site Checking	Choice of delivery agent/transporter	K3
	3	Measurement	Raw material for fabrication	Usage of construction tools as per standard
	4	Shop drawing	Choosing suitable material	Completeness of permit documents
	5	Material design	Site coordination	Project finish on time
Expert 7, Quality Control, Jakarta Project	1	Material design	Schedule material	K3
	2	Site survey / measurement	Material adjustment	Site coordination
	3	Technical drawing	Delivery material using suitable transporter	Completeness of permit documents

Table 3. Proposed KPIs from Project/Customer Feedback (Continue)

Respondents	KPIs	KPI DESIGN	KPI SUPPLY	KPI CONSTRUCTION
	4	Approval design	Material intact when arrive on site	Technical coordination
	5	Material design completeness	Choosing the suitable material quality	Regular monitoring : whether as per desired method
Expert 8, PPIC, Jakarta Project	1	Site survey / measurement	Checking completeness of material	Quality control and monitoring
	2	Approval design	Choosing good quality material	Project on time
	3	Accuracy of technical drawing	Checking required material quantity	Job Safety
	4	Material adjustment	Timeliness on material ordering	Quality control on material installation
	5	Site coordination	approval	Progress monitoring

Source : Authors, 2019

Table 4. Existing KPIs of PT. Smart-modular Building Indonesia

Department	Process	Quality Objectives
Marketing	Market product and service	Success rate from quotation into customer order
	Conduct customer satisfaction survey	Customer Satisfaction Index
Engineering	Make and control Engineering Document	On time distribution of engineering document
Project	Installation process	Project completion on schedule
		Project completion within budget
		No customer complaint against installation quality
PPIC	Procure materials	Quality of received material is as per specification and on time
	Inventory	No damaged or loss in Material Inventory
Delivery	Delivery	Material delivery to site on time
		No damage on Material delivery
HR & GA	Training	Fulfilment of grade 3 employee according to position
HSE	HSE Maintenance	Avoid accidents on project sites
Finance	Manage Account Payable and Account Receivables	On time A/R
		On time A/P

Source: Authors, 2019

Figure 4. Result of BSC Affinity Diagram Workshop
Source: Authors,2019

Table 5. Final KPIs – Whole Company

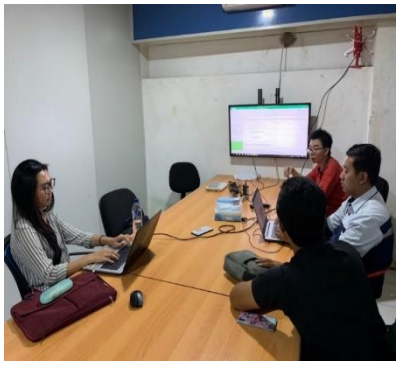
		KPIs in High Level	Formula	Cascaded into		
				D	**S**	**C**
FINANCIAL	F1	% budget variation	$\frac{Total\ actual\ cost}{Total\ budgedt\ cost} x\ 100\%$	√	√	√
	F2	On time Account Receivables (A/R)	$\frac{\#\ of\ monthly\ on\ time\ payment\ \ from\ cust}{\#\ of\ monthly\ dued\ payment\ from\ custo}$		√	
	F3	On time Account Payable (A/P)	$\frac{\#\ of\ monthly\ on\ time\ payment\ \ to\ supplie}{\#\ of\ monthly\ dued\ payment\ to\ supplier.}$		√	
	F4	% Net Variation	*COGS = Beginning Inventory + Purchases - Ending Inventory*		√	
	F5	Cash balance (positive or negative cashflow)	*actual cash – plan Cash*		√	
INTERNAL BUSINESS PROCESSES	I1	% On time distribution of engineering document	$\frac{\#\ of\ on\ time\ distributed\ Drawing}{\#\ of\ issued\ drawing} x\ 100\%$	√		
	I2	% of material damage in storage	$\frac{\#\ of\ damaged\ material}{\#\ of\ material} x\ 100\%$		√	√
	I3	% of on time material delivery to site	$\frac{\#\ of\ on\ time\ delivery}{\#\ of\ scheduled\ delivery} x\ 100\%$		√	
	I4	% of material damage during delivery	$\frac{\#\ of\ meterial\ received\ on\ site}{\#\ of\ material\ delivered\ to\ site} x\ 100\%$		√	
	I5	Avoid accident on site	*# of monthly on site accident*			√
	I6	Ratio between back office and site workers	$\frac{\#\ of\ employee\ in\ the\ office}{\#\ of\ employee\ on\ site} x\ 100\%$	√		√
	I7	% Monthly deviation of schedule (Plan vs actual)	$\frac{Planned\ work\ scheduled}{Actual\ work} x\ 100\%$	√		√
	I8	Effective working day	*target working time - lost working time*	√		√
	I9	% failed test	$\frac{\#\ of\ failed\ test}{\#\ of\ planned\ test}$	√		√

Table 5. Final KPIs – Whole Company (Continued)

	I10	% regular checking (to conform with specification)	$\frac{\boldsymbol{Actual\ quality\ check}}{\boldsymbol{Planned\ quality\ check}} \boldsymbol{x\ 100\%}$			√
	I11	% conformance material on drawings	$\frac{\#\ of\ material\ used\ by\ Engineering}{J\#\ of\ purchased\ material} x\ 100$	√	√	
LEARNING & GROWTH	L1	Fulfilment of grade 3 employee according to position	$\frac{\#\ of\ employee\ with\ \min skill\ level\ 50\%}{\#\ of\ employee} x\ 1$	√	√	√
	L2	Success rate from quotation into customer order	$\frac{Total\ PO\ value}{Total\ quotation\ value} x\ 100\%$	√		
	L3	Technology : # of skilled employee & Tools	$\frac{\#\ of\ skilled\ employee}{\#\ of\ project} x\ 100\%$	√	√	√
	L4		$\frac{\#\ of\ tools}{\#\ of\ project} x\ 100\%$	√		√
	L5	Satisfaction on design team	*Average satisfaction result on design team (questionnaires)*	√		
	L6	Satisfaction on construction team	*Average satisfaction result on construction team (questionnaires)*		√	
	L7	Satisfaction on Supply Team	*Average satisfaction result on supply team (questionnaires)*			√
	L8	Cost predictability	$\frac{Value\ of\ variation\ works}{Value\ of\ construction\ work}$			√
CUSTOMERS	C1	Customer satisfaction index	$\frac{Average\ customer\ satisfaction}{Number\ of\ customer\ in\ 6\ month}$	√		
	C2	% Customer complaint	$\frac{\#\ of\ customer's claim}{\#\ of\ received\ NCR}$			√
	C3	Material Quality	$\frac{\#\ of\ material\ in\ good\ condition}{\#\ of\ received\ material}$		√	√

Source : Authors 2019

The workshop with design team were done with 3 key stakeholders, with supply team with 4 stakeholders and with construction team with 3 stakeholders, as visualised in Figure 5. The complete KPIs with BSC framework is shown in Table 5.



a. With Design team

b. With Supply team

c. With Construction team

Figure 5. Affinity Workshops in 3 Cascaded Teams

Measuring KPIs

Once the KPIs were agreed and finalized, the next step was to do measurement on the current level. Measurement was done for first quarter of 2019 only, as no measurement mechanism was in place. The measurement is necessary in order to get insight on the current level and provide basis for setting target and action plan.

It should be noted that some of the KPIs are accumulated KPIs, e.g. KPIs F1 and I7. These kind of KPIs were cascaded down from high level, and separate measurement can be done in lower level. There is also joint KPI, e.g. I2, where responsibility is in two areas but shared into one measurement. For this kind of KPIs the related areas must synergy their actions and activities in order in performing action plan and achieve the desired target. The rest of the KPIs is dedicated to each area and also ascended into high level KPIs.

After measurement was done, target for 2019 and 2020 as well as action plans were set and brainstormed with the same key stakeholders. Summary are shown in **Table 6-8**. Some action plans were identified during the workshop. However, for those KPIs where no measurement yet in place, the next action plan will be measurement itself. During the workshop it was acknowledged to continuously maintaining the BSC by continuous KPIs measurement, regular target setting and regular action plan setting. By then strong strategy for the whole company can be materialized.

Table 6: Measurement, Target & Action Plan – Design

BSC Quadrant		KPIs	Current Measurement			Target		Action Plans
			Jan 2019	Feb 2019	Mar 2019	2019	2020	
Finance	F1D	% budget variation – In design stage	NYM	NYM	NYM	20%	20%	Control and Monitoring Budgeting process in order to reduce number of unconfirmed works
Internal Business Process	I1	% On time distribution of engineering document	100%	100%	100%	100%	100%	Increase mobility of design team
	I6D	Ratio between back office and site workers – in Design	5,80%	5,80 %	5,80%	5%	5%	Adjust in incoming /future recruitment
	I7D	% Monthly deviation of schedule (Plan vs actual) – During design process	NYM	NYM	NYM	95%	98%	Better and more detail scheduling.
	I8D	Effective working day – for design team	85%	82%	88%	90%	95%	Enforce attendance discipline to staffs
	I9D	% failed test – during design process	NYM	NYM	NYM	90%	95%	Provide resources : crew and tools for QC test
	I11	% conformance material on drawings – during design process	83%	89%	92%	95%	98%	Regular assessment on material conformance during design process
Learning and Growth	L1D	Fulfilment of grade 3 employee according to position	60%	60%	60%	50%	75%	Employee training
	L2	Success rate from quotation into customer order	NYM	NYM	NYM	30%	35%	Prioritize high margin projects
	L3D& L4D	Technology : # of skilled employee & Tools	NYM	NYM	NYM	10%	10%	Increase performance team, standardize work with template
	L5	Satisfaction on design team	NYM	NYM	NYM	4	4	Regular brainstorming with supply and project
Customer	C1	Customer satisfaction index	NYM	NYM	NYM	4	4	Make action plans from customer feedback

Note : NYM : Not yet measured

Source: Authors, 2019

Table 7. Measurement, Target & Action Plan – Supply

BSC Quadrant		KPIs	Current Measurement			Target		Action Plans
			Jan 2019	Feb 2019	Mar 2019	2019	2020	
Financial	F1S	% budget variation – in supply stage	30%	71%	52%	100%	100%	Control and monitoring financial of procurement process and minimize expenses
	F2	On time Account Receivables (A/R)	65%	46%	0%	70%	80%	Increase schedule of A/R Checking & updates to customers
	F3	On time Account Payable (A/P)	100%	61%	41%	80%	90%	Reinforce on-time payment to suppliers
	F4	% Net Variation	24%	1,30%	14%	8%	5%	Perform financial budget planning for next period in order to reduce number of unexpected expenses
	F5	Cash balance (positive or negative cashflow)	NYM	NYM	NYM	Positive	Positive	Reinforce negotiation with existing suppliers and regular search of alternative suppliers
Internal Business Process	I2	% of material damage in storage	100%	100%	100%	100%	100%	Enforce FIFO Increase security
	I3	% of on time material delivery to site	100%	100%	100%	100%	100%	Better delivery planning between supply team with projects' team .
	I4	% of material damage during delivery	100%	100%	100%	100%	100%	Enforce proper packaging with suppliers.
	I11	% conformance material on drawings – during supply process	NYM	NYM	NYM	100%	100%	Regular assessment on material conformance during supply process
Learning and Growth	L1S	Fulfilment of grade 3 employee according to position	50%	50%	50%	50%	75%	Employee training
	L3S	Technology : # of skilled employee & Tools	NYM	NYM	NYM	10%	10%	Increase performance team, standardize work with template
	L7	Satisfaction on Supply Team	NYM	NYM	NYM	4	4	Regular review on price and delivery to site
Customer	C3	Material Quality	100%	100%	100%	100%	100%	Start performing joint checking with QC on incoming material

Note : NYM : Not yet measured

Source: Authors, 2019

Table 8: Measurement, Target & Action Plan – Construction

BSC Quadrant		KPIs	Current Measurement			Target		Action Plans
			Jan 2019	**Feb 2019**	**Mar 2019**	**2019**	**2020**	
Financial	F1C	% budget variation	64%	54%	10%	100%	100%	Control and monitoring financial budget process and minimize expenses
Internal Business Process	I2	% of material damage in storage	100%	100%	100%	100%	100%	Enforce FIFO Increase security
	I5	Avoid accident on site	0	0	0	0	0	Enforce K3 & HSE Standards in all project sites
	I6C	Ratio between back office and site workers – in Construction	0	0	0	20%	20%	Adjust in incoming /future recruitment
	I7	% Monthly deviation of schedule (Plan vs actual) – during construction process	21,40%	21,40%	21,40%	95%	98%	Better and more detail scheduling.
	I8	Effective working day	NYM	NYM	NYM	90%	95%	Enforce attendance discipline to staffs
	I9C	% failed test – During construction process	100%	100%	100%	90%	95%	Provide resources : crew and tools for QC test
	I10	% regular checking (to conform with specification)	NYM	NYM	NYM	90%	95%	Training to site managers
Learning and Growth	L1S	Fulfilment of grade 3 employee according to position	100%	0%	100%	50%	75%	Employee training
	L3D& L4D	Technology : # of skilled employee & Tools	59%	59%	59%	10%	10%	Increase performance team, standardize work with template
	L6	Satisfaction on construction team	NYM	NYM	NYM	4	4	Regular brainstorming
	L8	Cost predictability	NYM	NYM	NYM	100%	100%	Better budget planning and optimize cost
Customer	C2	% Customer complaint	NYM	NYM	NYM	100%	100%	Enforce FIFO on material and quality control on storage
	C3	Material Quality	100%	100%	100%	100%	100%	Start performing joint checking with QC on incoming material

Note: NYM : Not yet measured

Source: Authors, 2019

CONLCUSION & SUGGESTION

The study successfully implements PMS in the studied company using the Balanced Score Card framework. BSC forced the stakeholders to measure and take action not only in financial areas, but also in other areas, making it a balanced PMS.

Using Affinity diagram workshop when finalising KPIs, target and action plan enhances people empowerment which believed will enhance commitment for maintenance and continuous improvement. As expected, most of the KPIs for the studied company falls into Internal business process and Learning& growth quadrant, since the process is important for them.

For the studied company, it is recommended to maintain its BSC PMS by continuous measurement and review. The study has limitation in term of too little measurements (3 months only). Nevertheless, it is sufficient to set a complete BSC framework for the studied company

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