

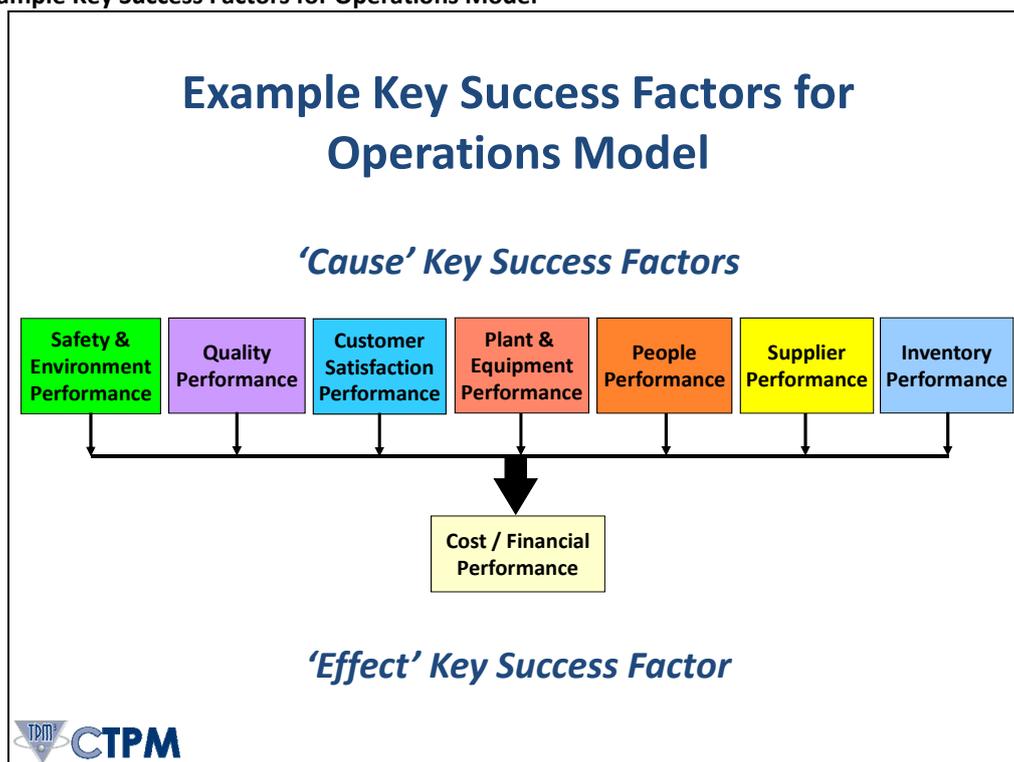
What Gets Measured Gets Done!

Key Success Factors for Operations

A key foundation for Operational Excellence is to have Goal Aligned Performance Measures. This is where all measures, at all levels of the operation, align to the Key Success Factors for Operations. In other words, all measures should be based on, and reported under, your site's Key Success Factors for Operations so that everyone can see where their performance contributes to the overall site performance.

Before we look at what measures should be reported on at each level we need to understand the Key Success Factors for Operations.

Figure 1: Example Key Success Factors for Operations Model



We can divide Key Success Factors into 'Causal' and 'Effect'. In other words what Causes us to have an Effect?

In the case of Operations, it is all about achieving a required Cost / Financial Performance so that the business achieves its required Return on Investment. Without the required Return on Investment, the operation will more than likely lose its ability to source further investment and there will be a push to reduce spending on long term essentials such as People Development and Preventive Maintenance all of which sends a site down the spiral of decline.

Hence the 'Effect' is Cost / Financial Performance and the 'Causal' Key Success Factors are the things that cause us to either make or lose money from an operational perspective.

In the table below we have listed the most common 'Causal' Key Success Factors we come across in a typical manufacturing or mining company and the possible impact if they are not right.

'Causal' Key Success Factor	'Effect' if not right
1. Safety & Environment Performance	If we have accidents, injuries or incidents it can be very disruptive and cost a lot of money
2. Quality Performance	If we don't get the right things right first time, we will waste a lot of materials and time resulting in higher costs
3. Customer Satisfaction Performance	If we don't satisfy our internal and external customers with delivery and quality expectations, we will cause delays in our processes, lose sales or have a lot of claims resulting in loss of income
4. Plant & Equipment Performance	If our plant & equipment does not perform well and is not looked after, we will lose capacity and have higher maintenance costs
5. People Performance	If people don't turn up or are not productive, or don't find problems at the earliest possible time, we will end up with higher costs
6. Supplier Performance	If our suppliers let us down or provide inferior goods or services, our costs will go up
7. Inventory Performance	If we carry too much inventory, we will have too much cash tied up in the business which can incur interest costs, or if we don't have enough inventory, we can miss opportunities or delay operations

Some companies like to:

- Use different names such as Human Resource Performance rather than People Performance;
- Split the 'Causal' Key Success Factors into more headings; or
- Reduce the number.

However, from our experience if you can keep it to 8 or less headings including Cost / Financial Performance, it makes it easier to create Scoreboards. The less complicated the better, as it allows your people to have a clearer 'line of sight' or better alignment to company goals.

This is important because the aim of Goal Alignment is to allow anyone in the business to see how their input is affecting the site performance. For example, the Safety Performance in one area will feed into the Safety Performance of the entire site.

Order is Important

When establishing the 'Casual' Key Success Factors we find the order is very important because even if we tell everyone they are all important, people, especially your managers or leaders, will prioritise their actions around their perceived order of importance.

For example the Quality Manager may perceive quality is more important than delivery and will advise the Despatch Area to hold off on delivering an order to a customer until further quality checks are carried out, whereas the Production Manager may perceive delivering on time and meeting delivery targets is more important and instruct the Despatch Department to send the order because it must be there by an agreed time or before end of month to allow invoicing. Meanwhile your workforce in Despatch become confused, and more than likely, not make decisions themselves because they know if they did they will displease one of the Management Team.

We should never forget the maxim: ***“Measures dictate Behaviour”***

The initial order we have used is Safety first, then Quality which is influenced by the book: *The Toyota Way to Lean Leadership* by Jeffrey K. Liker and Gary L. Convis, where they state ‘quality is never sacrificed for cost or expediency’. The remaining order can vary from site to site so we have used the most common order we come across recognising at your site you may have different priorities and hence use a different order.

For example, at some sites we come across, the operation is very dependent on manual assembly of the products with little machinery to assist apart from a sealer at the end. In these situations you often find the People Performance Key Success Factor is moved in front of the Plant & Equipment Performance Key Success Factor.

We see it as the role of the Site Management Team (Site Manager and direct reports) to determine on a consensus basis, the order of the Key Success Factors they want for the site so that all Scoreboards covering Site, Department, Area, and Crew are created based on the appropriate Key Success Factors with the headings in the agreed order.

Establishing Performance Measures

Once the Key Success Factors are agreed, you can then group your performance measures under the appropriate heading. This way you immediately see if there are any gaps in what you are currently measuring.

At one site, the Management Team selected what they thought were the appropriate measures and placed them under their Key Success Factor headings. Each week they highlighted with a large green tick or red cross whether they achieved the target or not. During a visit, I noticed that all the performance measures under the ‘Causal’ Key Success Factors were a green tick, yet the ‘Effect’ Key Success Factor of Cost / Financial Performance was a red cross. This didn’t make sense as the logic is ‘if all the casual measures are on target, then the effect should be on target’. When challenged, the Management Team realised they were not measuring a critical raw material inventory issue that had blown out over the past 2 weeks having a significant impact on costs.

Ideally we have found that 2-3 performance measures per Key Success Factor should be sufficient so as not to make the scoreboard too complex or difficult to quickly comprehend.

Some helpful rules to apply when establishing the measures are:

- Have all charts set up so that upward trends are good and downward trends are not good;
- Have all scoreboards standardised so that the same measures are located in the same place on all Scoreboards;

- Ensure the Site Scoreboard sets the minimum standard for all other Scoreboards regarding layout, accuracy, clarity and timeliness; and
- Ensure all key areas of measurement for operations are covered on the scoreboard.

Displaying your Performance Measures

The next action should be to agree on how the measures should be displayed so there is a site standard created that is easy to tell the status and trend as you walk past say 2 metres from the Scoreboard. Typically sites will start with a Site Scoreboard that has all 'Causal' measures reported on a weekly basis using printed coloured bar charts where a green bar indicates that the target / expectation has been achieved or exceeded, and a red bar indicates that the target has been missed. On the other hand, we have found Daily Review Meetings where performance is measured daily and daily run charts are created for the month to monitor trends, then a simple hand drawn run chart is preferred over a bar chart as we don't want people wasting their time colouring in bar charts each day.

How to create the Site Scoreboard is also an issue for many sites. Some want to go for very fancy solid boards which are fixed to the wall and each chart is printed on the board. Our experience suggests a simpler pilot approach is often a better way to start. As such we tracked down Tri-fold Display Boards from Foamboards.com.au which can be very quickly and cheaply established to test out the layout and choice of measures before going to a more permanent solution. The foam boards also proved to be very helpful in being able to be displayed in the workplace where everyone walks past, yet easily collected and carried to the meeting room for all to see when conducting the Weekly Review Meeting.

Figure 2: Suggested initial Scoreboard Material & Dimensions

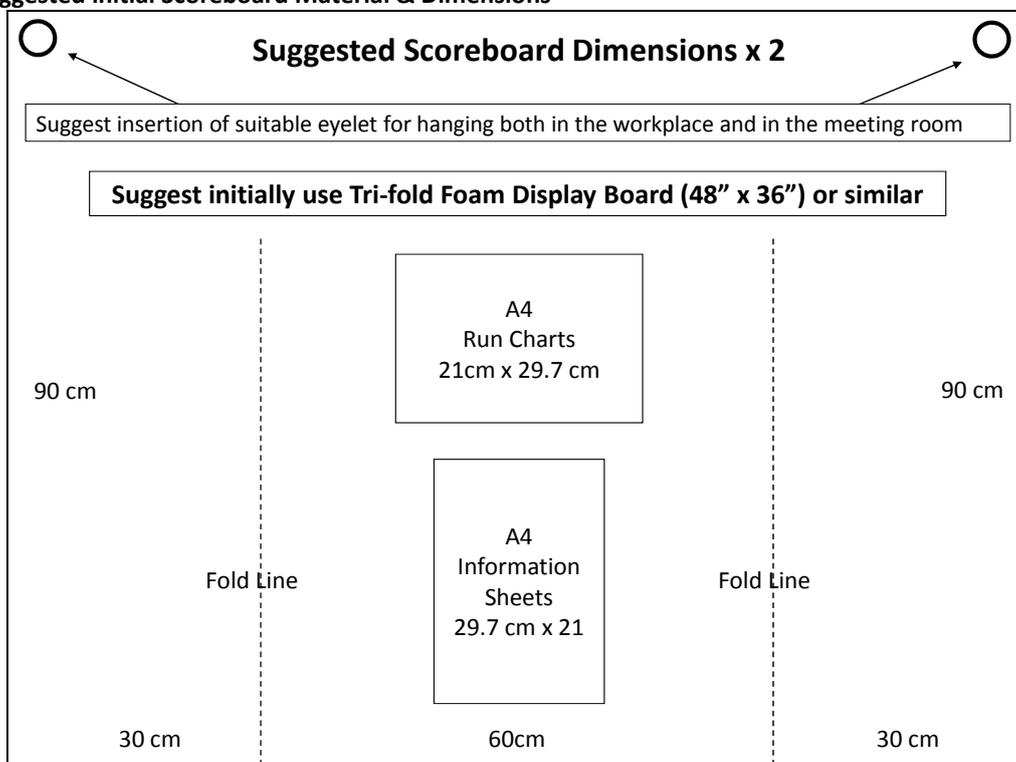


Figure 3: Sample Site Scoreboard Layout

Sample Site Scoreboard 1				Sample Site Scoreboard 2			
Safety, Health & Environment	Quality	Customer Satisfaction	Plant & Equipment	People	Supplier	Inventory	Costs
Zero Harm, Zero Incidents	Do it right First Time; eliminate all Waste	Delivery in Full, on Time, within Spec	Perfect Equipment Performance & Reliability	Effective People engaged in the Business	Reliable, High Quality Suppliers	Appropriate Inventory Levels	Most Cost Effective Producer
Safety All Injuries Weekly Chart	% Scrap Weekly Chart	Delivery Weekly Chart	Unplanned Downtime Weekly Chart of Site	Productivity Weekly Chart	Supplier Delivery Weekly Chart	RM Stock Levels Weekly Chart	Energy Cost / Output Weekly Chart
Environment Incidents Weekly Chart	% Yield Loss Weekly Chart of Site	Customer Complaints Weekly Chart	OEE (A x R x Q) Weekly Chart of Bottleneck Line	Unplanned Absences Weekly Chart	Supplier Quality Weekly Chart	WIP Stock Levels Weekly Chart	Maint Cost / Output Weekly Chart
Summary Baseline & Targets	% Rework Weekly Chart	Output Weekly Chart	% PM Compliance Weekly Chart	Continuous Improvement Time Weekly Chart		FG Stock Levels Weekly Chart	Total Cost / Output Weekly Chart

Once the design of the Site Scoreboards are finalised, the next step is to populate the scoreboards so they are easy for anyone walking past to see how performance is tracking, and placed in an area with high foot traffic (where most people at site walk past).

Figure 4: Example locations of Site Scoreboards



Establishing a Baseline and Targets

If you don't know where you are, how can you get to where you want to be?

When embarking on your improvement journey you should establish a starting point or baseline, and then quantify your Improvement Vision. For example if your Improvement Vision is to achieve Operational Excellence and your timeframe is 5 years, then you should be able to quantify what you expect your performance to be in 5 years using the Key Success Factors for Operations model developed in Figure 1.

A useful process for doing this is outlined below:

1. Establish the Key Success Factors for Operations along with relevant Performance Measures and Definitions.
2. Determine Timeframes for determining the Baseline and the annual results to allow Monitoring of Progress – timeframe for comparing performance is normally the previous 6 week average if it is a weekly measure, or the previous 3 month average if it is a monthly

measure, where all measures should be reviewed weekly apart from the Costs / Financials as they are normally locked into monthly reporting.

3. Establish World Class Timeframe – our experience is that in most cases a 5 year timeframe is the most realist stretch target.
4. Establish Targets for World Class Performance – targets are normally determined using 4 methods depending on the measure:
 - a. Absolute such as zero for accidents or 100% for delivery;
 - b. Calculated based on agreed assumptions as in the situation for OEE¹;
 - c. Benchmarked where you compare to reported best practice from another site or company; or
 - d. Upper Control Limit where you create a run chart of the performance and use Statistical Process Control equations to determine the Upper Control Limit and then make this your target.
5. Establish Annual Targets to support World Class Targets – targets are normally determined using 3 methods depending on what you are measuring and the expected impact from improvement:
 - a. Linear where improvement will have a consistent impact over the 5 years;
 - b. Upward exponential where you expect most of the improvement to occur in the later part of the 5 years after all the foundation work has been completed; and
 - c. Downward exponential where you expect a lot of gains from the ‘low hanging fruit’ in the early years with improvement becoming harder in the later years.

Figure 5: Sample Site Baseline Measures & Targets spanning

Key Success Factors	Performance Measures	Definitions	Baseline	Year 1 Target	Year 2 Target	Year 3 Target	Year 4 Target	Year 5 Target
Safety & Environment	Lost Time Injury Freq Rate	Per million man hrs	18	15	12	9	5	0
	Med Treat Injury Freq Rate	Per million man hrs	100	80	60	40	20	0
	Environmental Incidents	# Incidents per 12 mths	5	4	3	2	1	0
Quality	Scrap	% of Total Processed	20%	15%	11%	8%	4%	1%
	Rework	% Hrs / wk	8%	6%	4%	2%	1%	0%
	Yield	% Recovery	90%	91%	92%	94%	96%	98%
Customer Satisfaction	Delivery to Customer	DIFOTQ	98%	98%	99%	100%	100%	100%
	Customer Complaints (Ext)	Complaints - ppm	50	40	30	20	10	0
	Achievement of Prod Plan	% Achieved	89%	92%	94%	96%	98%	100%
	Lead Time	Days or Hours	5 days	4 days	3 days	2 days	1 day	4 hrs
Plant & Equipment	OEE (if applicable)	Value Add Time Equation	60%	70%	75%	80%	85%	87%
	Capacity	Output / Week	160kt	185kt	200kt	210kt	225kt	230kt
People	Productivity	Good Output / worked hrs	20	23	26	30	35	40
	Unplanned Absenteeism	% of hrs worked	5%	4%	3%	2%	1%	1%
	On-going CI Time	% hrs / worked hrs	1%	2%	4%	6%	8%	10%
Supplier	On Time Delivery	% of Items Purchased	75%	80%	85%	90%	95%	99.9%
	Quality Issues	% of Items Purchased	5%	4%	3%	2%	1%	0.1%
Inventory	Raw Materials Inventory	Days of Sales	14	13	11	9	7	5
	Work In Progress Inventory	Days of Sales	21	17	13	9	5	3
	Finished Goods Inventory	Days of Sales	14	12	10	8	5	3
Costs	Maint Cost	\$/ output	\$0.60	\$0.55	\$0.50	\$0.45	\$0.35	\$0.30
	Prod Cost	\$/ output	\$2.40	\$2.20	\$2.00	\$1.80	\$1.60	\$1.50
	Energy Cost	\$/ output	\$0.70	\$0.68	\$0.65	\$0.60	\$0.58	\$0.55
	Total Cost / Output	\$/ output	\$9.50	\$9.00	\$8.00	\$7.00	\$6.50	\$6.00

References:

¹ *Understanding, Measuring, and Improving Overall Equipment Effectiveness by Ross Kenneth Kennedy Aug 2017 CRC Press*

Call to Action

We recognise it can be quiet daunting establishing a baseline that will capture all your performance outcomes across your entire operation, it is never easy. The important thing to remember is that in order to improve your current performance you need to establish a baseline so that you know exactly what impact your improvement activities are having.

“You Can’t Manage What You Can’t Measure”

The Site Management Team should reflect on this article, and then they should have an initial go at confirming or establishing the site’s Key Success Factors for Operations, the order for them to be presented and the performance measures to be reported under each Key Success Factor.

Once this has been agreed upon, you then need to establish the site standard for displaying the performance measures and introduce it first to the Site Management Weekly Review Meetings, and then to all the remaining Daily Review Meetings throughout the site.

As you are progressing the introduction of standard performance measures throughout the site, thought should be given to establishing a baseline and improvement targets supported by monitoring, reviewing and enhancing the performance measures so that any corrections to the type or display of measures can be conducted immediately across all the Scoreboards.

If you would like to find out more about establishing Performance Measures to enhance your sites Daily Management approach, please contact Ross Kennedy at CTPM’s Head Office on +61 2 4226 6184, via mobile on 0418 206 108 or via email ross.kennedy@ctpm.org.au.