Assessing the Performance of the Engineering Department

An Online Continuing Education Course for Engineers

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1 Preliminary Considerations

The function of the Engineering Department is implicitly tied to that of its Company. To understand how well the Engineering group helps the Company achieve its objectives, the Engineering performance needs to be evaluated both individually and in tight relationship with the performance of the Company and of the other Departments. This will enable the decision-makers (the Executives and the Engineering leadership) to understand what activities are executed efficiently, and what can be done better to support the Company's strategic needs.

All of the participants to the Engineering function (Engineers, Managers, Technicians, Draftsmen, etc.) will need to have a good understanding of how the Engineering operation is evaluated and how it contributes to the Company's performance. This understanding not only clarifies the function of the Engineering group and eases the reporting to the Executive leadership, but it also provides the Engineering individual contributors with tangible ways of understanding and improving their particular performance, such that the overall targets are achieved. Choosing the most relevant metrics encourages performant work habits for the team and team members.

This course will show rational approaches to defining a suite of metrics that are relevant to the Engineering group, in ways that stimulate the desired functions, improves its performance, and help the Company overall. In addition to measuring the Engineering performance, the course will also cover various aspects of measuring the Engineering creativity, as this group is often entrusted with generating ideas for new products, processes, or services, besides just converting the existing ideas into new products. There are literally hundreds of metrics that can be implemented in Engineering [1], and using all of them to understand the Engineering functions is counterproductive. Engineering leaders will need to understand the best way to select, track, and act upon the metrics that are important to the Company's performance.

This course will benefit not only the Engineering Managers and the leaders responsible for the performance of the Engineering groups, but also the Engineers and other individual contributors of any discipline that are contributing to the groups' performance. The leaders will be able to measure the groups' performance and align it

with the Company's strategic objectives, while the individual contributors will better understand why the focus is oriented towards specific actions, why it sometimes shifts, and how they can improve the overall operation.

The Engineering leadership will need to establish a methodical, robust, and predictable way to measure Engineering performance that is in line with the Company's strategic objectives and is also synchronized with the performance of the departments adjacent to Engineering. The value of each implemented metric depends on how it is used, and most fundamentally, how well it improves the Company's bottom line.

2 Definitions and Assumptions

The Analyst is the Engineer responsible for implementing and tracking the metrics and KPIs in the Engineering Department. They are often the Engineering Manager or Leader or a senior Engineer that has a profound knowledge of the specific function of the Engineering Department in the Company, as well as its processes. Moreover, the Analyst needs to have a deep understanding of the Department's relationship with the other collaborating groups inside the Company and with its business partners outside the Company.

Engineering is the group in the Company that is tasked with resolving the technical challenges of the product or service that the Company delivers to its Customers. It is comprised of Engineering Managers, degreed Engineers, and other technical personnel. It can be formalized in an explicitly organized group or split into a few groups that are dedicated to specific functions (such as Quoting, Delivery, NPI, Tech Support, etc.). Alternatively, it can be a number of Engineers in a few departments that are informally coordinated to help each function.

The product and the service represent the Company's deliverables, what it sells for revenue and profit. The Engineering group has significant input into their performance, either by creating novel instances (incremental or completely new) or just by maintaining them.

3 Operational Metrics and KPIs – Introduction

Operational Metrics are measurements that can be used to assess, compare, and track the performance of a Company, a group within the Company, individuals or Projects, against the Company's strategic objectives[2], [3] expressed as the stakeholders' short and long term needs. This is valid for every function in the Company, from the groups that comprise the core operational workflow (Sales, Project management, Engineering, Production, Shipping, Aftermarket Support, etc.), to the business supporting groups (Finance, Legal, HR, Product Management, etc.).

Key Performance Indicators (KPIs) are a set of *significant* metrics[4] used to determine the status of a Company, a group within the Company, individual contributors, or Projects, against the Company's strategic objectives. The KPIs are a subset of the metrics that are determined to be key, vital, critical, and significant – the tautology has been intentional here, in order to accentuate the meaning.

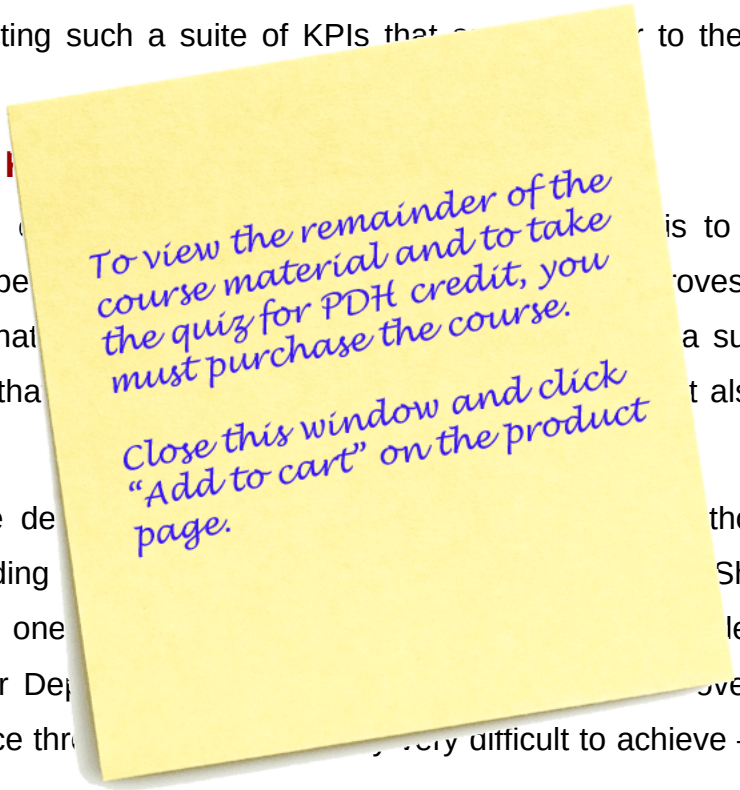
KPIs are often receiving the most attention, but that should not encourage the Analysts to discard other metrics. When the current KPIs are found to be unable to adequately reflect the situation on the ground (as they could be determined ambiguous, un-actionable, or stale), the Analysts will be able to reach out to the general pool of available metrics and promote some to KPIs, that can ensure the correction of the situation.

To make this more clear, it has been said that "everything we [can] measure is a metric. If it reflects performance, it becomes a KPI"[5] – note the emphasis on performance. KPIs are a critical part of a Company's strategy, as they focus energies towards what really matters for the Company.

The implementation of the KPIs is meant to provide a clear and tangible view of the operations of a group, disconnected from any subjective opinions, perceptions, and biased assessments. The KPIs will reduce the functional complexity of a group to levels that are representing their function in a simple, yet sufficient, manner. This will allow the decision-makers to gain an accurate view of the performance, then make better strategic decisions.

There is a very large number of KPIs that can be considered, many of those with opposite effects on the function of a department, project, or individual. Although opposite, they are often complementing each other, and should often be looked at in pairs. A common example is measuring the On-Time-Delivery (OTD) of products. If this is the only metric used, the team will focus all its energy to achieve it (as it has been implicitly communicated that this is the only thing that matters). This may happen at the expense of other important parameters, such as the quality of the considered products. While the OTD will be achieved and may even become stellar, other sides of the Company may suffer – for instance, the Warranty claims will very likely go up, the Cost of Quality will increase, and the market share of the product will probably be eroded. This example shows the need to implement a suite of KPIs that is complete and achieves the Company's objectives, not just the immediate need to show improvement in a specific area.

An astute Analyst will select a practical, minimal, and connected set of KPIs (not just a few disparate KPIs) such that the picture they provide is broad, accurate, and well-aligned with the Company's strategic objectives. The following material will present the basics of selecting such a suite of KPIs that [illegible] to the function of the Engineering group.



4 Engineering K[illegible]

The end goal [illegible] is to understand the Engineering's own pe[illegible] roves the Company's performance. For that[illegible] a suite of KPIs and associated targets tha[illegible] t also to that of the Company.

Moreover, the de[illegible] those of adjacent Departments, including [illegible] Shipping, etc. It is often the case that one [illegible] levant to its own function while other Dep[illegible] overall view of the process performance thr[illegible] very difficult to achieve – and leading to