



Procedure for KPI definition

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Abstract *Measuring effectiveness and efficiency of the processes is the major premise for improvement of those processes. Unfortunately, the common case is that people define what to measure, based on their gut feelings. Result is indicators that looks fine, but indicate the wrong thing, thus induce them to take wrong action. In this paper, procedure for designing sound leading and lagging key performance indicators, will be presented.*

Key words: *Key performance indicators – KPI, lagging indicators, leading indicators, Risk management*

1. INTRODUCTION

Continuous improvement is the prime mantra of all world class organizations. And because leading organizations accepted that approach, many other organizations that have aspirations to become leading organizations, followed their approach.

Importance of measurement system for goodness of processes establishing is embodied in the saying of the Lord Kelvin 'If you cannot measure it you cannot manage it' [1]. Also, it is important to have in mind that "A critical enabler in achieving desired performance goals is the ability to quantitatively measure performance." [2]. So, the first step in leading organization towards success, is developing reliable system for measuring current level of goodness. But, there could be some trap. It is not enough to measure, but to measure the right thing!

2. LITERATURE REVIEW

In his book [3], David Parmenter stated: "Every performance measure has a dark side, a negative consequence, an unintended action that leads to inferior performance. I suspect well over half the measures in an organization may well be encouraging unintended negative behaviour.". Also, Joseph Raynus in his book [4] defined the law of unintended consequences as: "Any intervention in a complex

system may or may not have the intended result, but will inevitably create unanticipated and often undesirable outcomes." So, it is of crucial importance that defined key performance indicators – KPIs, are well designed and defined, to encourage positive, intended behaviour.

3. DESIGNING OF THE PROCEDURE

The procedure for developing the complete Performance Indicators System, which consists of 10 steps, is presented below.

3.1 Define the context

First step of designing Performance Indicators System, must be establishing of the context. Without knowing the reason for existing, vision, mission, strategic goals and value system of the organization, as well as stakeholders and their interest and existing constraints, it is impossible to design any useful performance indicator.

3.2 Propagation

Problem with having defined mission, vision and strategic goals is that shop floor workers can hardly make connection with their daily work. They can learn organizations mission and vision by hart, but they cannot comprehend how their daily work contribute to those. And, when it is not clear connection between

someone's work, it is almost impossible to define KPI that will measure that contribution. So, in this step, it is of crucial importance to learn how to define indicator that is really expressing exact contribution of one's work to organization's mission and strategic goals. Hoshin Kanri [5], is a lean tool (lean is a common name for Toyota Production System) that achieve exactly that: higher level goals are decomposing to their building elements – lower level goals, goals that stands for lower hierarchical levels of organization.

3.3 Root analysis

Once established goals of lower organizational units, it is necessary to analyse what are the components / activities that leads to achieving of those goals, but also the causes and influential factors. In the [6] author presented result of the survey of 157 companies that showed that only 23% had done extensive modelling to determine the causes of the effects they were measuring.

Goal components will be used for designing indicators that will be used for real measure of goodness and to synthesize higher level indicators. Causes and influential factors will be used for indicators needed for operational purposes, for making decisions on operational level. Also, those indicators will be indispensable source for information in the case of searching for the root cause of some problem.

It is advisable to represent those connections in the form of the tree (tree of goal components / actions, causes and influences / catalysts), because the deeper the analysis goes, the more precise indicators can be designed.

3.4 Lagging indicators

Before defining indicators, it is good practice to adopt general rules regarding design of those indicators. It is advisable to design every indicator in a positive manner. This means that indicator should always measure what is positive. Measuring some negative phenomenon, force employees to be focused on negative, which is, psychologically, undesirable condition. Another rule should be directed towards values that specific indicator can have. Whenever applicable, indicator should have values in the range 0–1, where is 0-bad and 1-best possible. In that way, everyone will have sense of direction and the level of achievement. Sometimes this is impossible, like in the case one wish to have indicator presenting profit or produced quantity or days without any injury.

Lagging indicators show the goal achievement level in the previous period. Sometimes, that is characterized as "counting the dead", because it is done what is done, and it is impossible to change anything about that. The only good about lagging indicators is that they are offering knowledge that can be used for the next planning period, or these indicators are good for comparison with planned values for specific period.

3.5 Leading indicators

Although lagging indicators are good for predicting if the plan will be achieved (in the stable conditions), sometimes it is necessary to have some indicators that can be used as a (early) warning signals, signals that something is happening, something that could cause changes and could jeopardize organization's plans. That type of indicators is called leading indicators. Those indicators are, in most cases, connected with risk management way of thinking. According to ISO 31000 standard [7], risk can have negative consequences (as we usually perceive risk) or positive (something that is completely inconsistent with the meaning of the term risk in some languages, specifically with Serbian language). This means that we can have two kinds of leading indicators: one that are indicating possible events that can have negative effects on organization's goals, and one that are indicating opportunities for achieving even better than planned results.

Usually, organizations have system made of exclusively of lagging indicators, which is not good. Some very general rule of thumb is that good system has roughly the same number of lagging and leading indicators. But there is no recommendation regarding number of leading indicators for opportunities. In practice, it is extremely rear to find this type of indicators in one Performance Indicator System. Possible reason for this could be that this type of indicators requires vast knowledge about specific area, thorough understanding of market and every influencing factor, and huge amount of time needed for analysis and design.

Another important thing regarding leading indicators is that they are tightly connected with uncertainty (if the sky is cloudy, it doesn't mean that it will surely rain) and time lapsed from first warning signal till the development of the unwanted phenomenon (time that is offered to decision makers to react). Because of this, it is advisable that each leading indicator has connected information regarding probability of developing unwanted event (event-1 transitioned to unwanted event-2 in 70% of all recorded situations) and time needed for transition (when event-2 occurred, it needed about 3 days after occurrence of event-1).

3.6 Synthesis

When designing Performance Indicators System, one should be extremely cautious not to overwhelm any decision maker with too much not-so-important information. This means that every decision maker must get only information that he/she needs, in the needed form, and nothing more. In most cases, synthesis will mean simple sum of the component's values, but in a rare occasions, some higher mathematical operations could be involved.

It is possible that during synthesis, lower level causes and influences / catalysts, are simply not applicable to the higher hierarchical level, so it is necessary to conduct similar analysis as for previous (lower) level and to define causes and influences / catalysts that are appropriate for the higher level.

Based on different nature of some indicators, sometimes it is necessary to use multi-criteria decision making tools, in order to get single value for indicator. For that purpose, Analytical Hierarchy Process [8] or Analytical Network Process [9] received most attention in the academic society in the recent years, and could be good choice.

3.7 Mind games

It happened many times that someone create "excellent" indicator and when it comes to implementation, indicator is showing good values, but results are not so good. The problem with working with people is that they are smart and if there is a chance that they can present them in better light with less effort, they will do it. This means that each and every indicator must be extremely robust. To achieve that, it is necessary that after designing every single indicator, one must invest huge amount of effort in trying to cheat

that indicator (doing anything other than what is needed, but achieving high values of that indicator). If he/she succeed in that, indicator is poorly designed and need improvement.

3.8 Simulation

When complete Performance Indicators System, is designed, it is wise to check if the system is driving organization towards real success or to some dead end. Simulation is one of the best tools for investigation of the long-term effects of Performance Indicators System. System dynamics, developed by Jay Forester [10] and further improved by John Sterman [11] is the perfect tool for this job. If simulation proved that developed Performance Indicators System is driving organization towards expected goal, the process of designing indicators is finished.

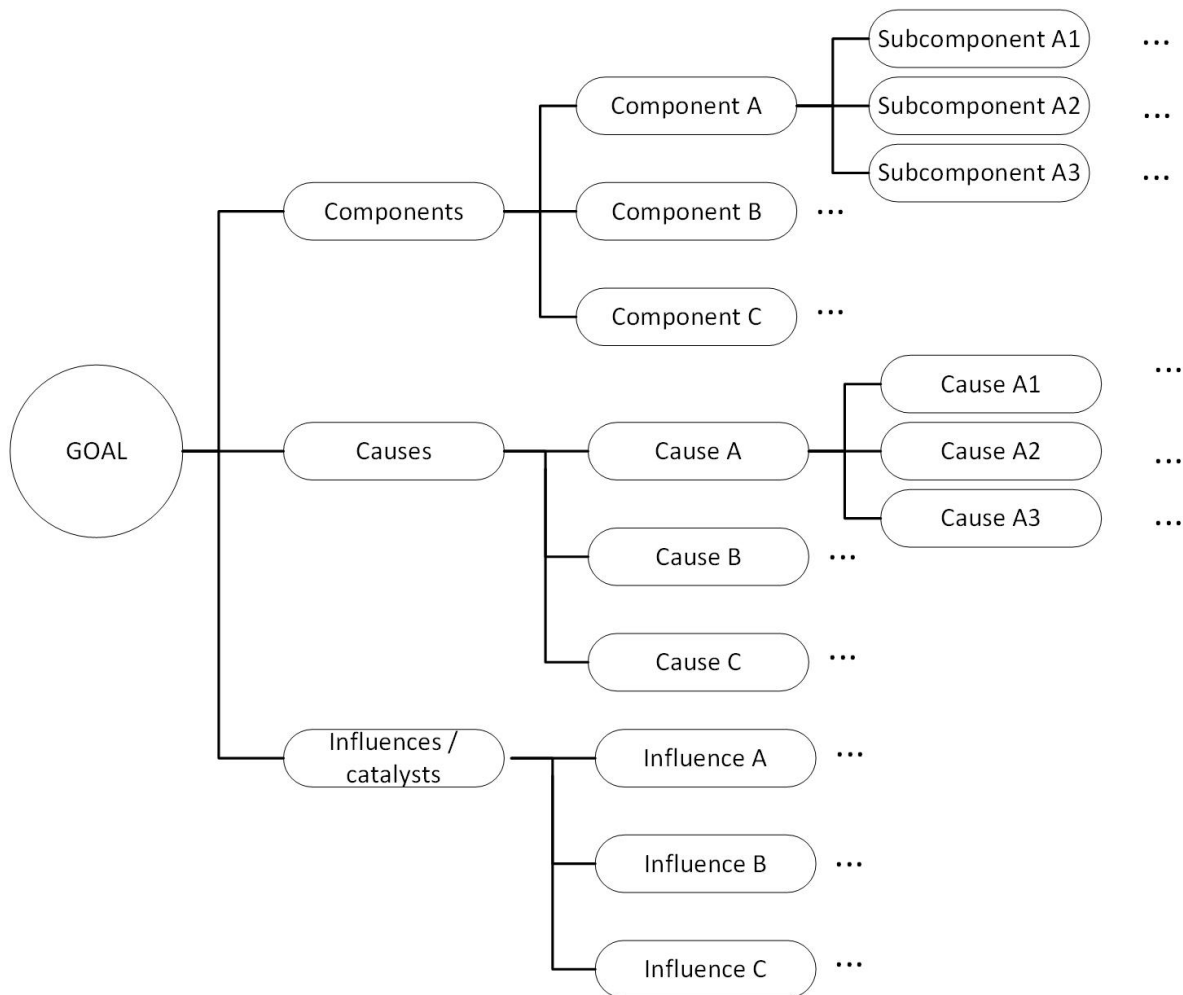


Figure 1: Tree of goal indicator's "building elements"

3.9 Operationalization

Next step is directed towards operationalization of necessary data collecting and analysis. It should be defined who, when, where, with which tool is collecting the data, where does he/she record that (paper form or software), who is authorized to oversee that activity and to whom the results should be sent.

3.10 Fine tuning

After finishing operationalization of Performance Indicators System, last phase, before company wide deployment, should be pilot testing. Organization should select one department / organizational part, suitable for testing each indicator and start to collect data. In this phase, organization should collect much

more data than needed just for developed indicators, because, besides data needed for calculating values for indicators, organization need data for verification that value of indicators is consistent with results which organization wish to achieve. If those values proved to be consistent, organization can deploy system in every organizational part. Otherwise, organization must find the discrepancy and correct it.

4. CONCLUSION

Continuous improvement has become a widely accepted way of securing success and sustainability of the organization in a demanding and turbulent market. One of the basic prerequisites for continuous improvement is having a realistic benchmark for success - key performance indicators. This paper presents the process of defining key performance indicators, which, if carried out conscientiously and responsibly, guarantees the definition of indicators that will provide a realistic picture of the organization's success. By establishing a system for monitoring the KPIs, the basis for organizational improvement is created, and thus the pre-conditions for the survival of the organization are created.

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