FRAMEWORK TO ELABORATE PERFORMANCE INDICATORS FOR OPERATIONAL AREAS

Paulino Graciano Francischini
Andresa Silva Neto Francischini

University of Sao Paulo – Production Engineering Department

ABSTRACT
The purpose of this article is to demonstrate a framework of performance indicators deployment to be used by the operational departments based on costs objectives, defined by the top management, and its internal clients’ expectations. The relevance can be explained considering that the literature review shows that there are many models and frameworks to guide the elaboration of performance indicators considering the strategic point of view of the companies. On the other hand, the deployment of these strategic performance indicators through the operational areas is not very well supported by the literature. The proposed framework analyses the cause and effect relations among top management objectives, department objectives, action plans to achieve this objectives and the effectiveness of these indicators to monitor their execution. Five groups of indicators are considered: internal clients’ expectation indicators, internal cost indicators, indicators of main causes, action plans indicators and internal suppliers’ expectations indicators.

Key Words: Performance Indicators, Operational Areas, Internal Clients.

INTRODUCTION
Since the 60’s, information systems have been developed to support the necessity to control the performance of the organizations. This kind of software has supplied the necessary information of the top managers to overview what happens in the entire organization. Many authors have worked on creation and use of indicators systems to manage business and operations (Francischini 2003, Martins 1999, Muscat & Fleury 1993, Kaplan 1992, Rockart 1979, etc). According to Kaplan (1992) “what you measure is what you get”. This phrase emphasizes the alignment among objectives, strategies, indicators and goals.

The gap that can be observed in literature is that many papers are focused on the development of strategic indicators which consider the entire company but few of them deal with the development of methods to deploy strategic indicators in operational indicators. This kind of indicator allows mangers from operational areas to have a correct direction about what the operational area has to do to support the strategic indicators.
**LITERATURE REVIEW**

Performance management is a way to implement and manage the corporative and functional strategies in a company, business or operations. The central sub systems created from from systems dedicated to performance management are indicator systems or performance measurement systems and they were created to provide enough and relevant information to a person who takes decisions. Although there are different ways to choose factors and indicators that have to be considered by these systems (Rockart, 1978), in general, there is a concern in integrating information from all areas, resumed as relevant.

According to Neely (2001) a good performance measurement system is the base to the performance management system. Then, the adoption of an adequate methodology can, in supposition, help to reduce the subjectivity in decisions, providing the person who takes decisions the objective information to develop his judgment.

Yet, according to Kaydos (1991), performance is the result of a decision taken. This means that the quality of a decision is a function of the quality of information available at the moment of the decision. However, it must be also considered observations from Neely (2000), that (a) the best decision does not necessarily implicate the achievement of best results; (b) since there are factors which are not incorporated to models and (c) there is also the aspect of aleatoric. Martins (1999) points that the number of studies about performance measurement systems has increased since the 90's.

*Total performance indicators and partial performance indicators*

Indicators have to provide knowledge to all people in an organization about the development of operations and the partial contribution that each one has in the achievement of objectives and targets. Diverse models of indicators have been developed and to make easier the presentation, these kinds of indicators have been classified in two groups: global and partial indicators: (a) Final or Global Indicators: these indicators evaluate the entire system, showing it as a black box; this way, operations and internal problems of a system can not be observed. (b) Middle and Partial Indicators: these indicators provide evaluation of a system in details, showing what is happening internally and they are used to solve a problem or to reinforce a positive result. These indicators provide less information than a global indicator, since they do not consider the entire system but only a portion of the system.

Companies are different and they show different necessities, so they select and choose models of indicators according to their reality. The choice of a model depends on the kind, size, production type and other relevant factors of a company, which derive from characteristics ad objectives of each company.
Internal clients and internal suppliers

Ishikawa (1985) defines internal clients as “the next process is your client”. If an operational area A inside the company uses the products, services or information that an operational area B produces, the area B is named “internal client” of the area A. Otherwise, the area A is the “internal supplier” of the area B. As demonstrated in the case studies, this concept, although simple, is extremely difficult to be understudied by the operational managers.

The Figure 2 shows graphically this relationship

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The purpose of this article is to demonstrate a framework of performance indicators deployment to be used by the operational departments based on costs objectives, defined by the top management, and its internal clients’ expectations.

Motivation

A field study with sixty operational managers and supervisors from Brazilian industrial companies show that the elaboration of indicators to measure the performance of operational departments is confusing and the process of monitoring is inefficient. First of all, this happens because these managers and supervisors have difficulties to identify their internal clients. It was demonstrated analyzing a questionnaire applied to them. Second, as these managers are always under pressure to reduce costs, they are not able to define which costs they are asked to reduce. Third, if they do not know why they are monitoring a performance indicator they will not use this indicator to develop actions to correct a dysfunction of the productive process.

The literature review, as demonstrated above, has few methods to deploy the strategic indicators, defined by the top management of the organization. The field study pointed some other difficulties:
the relationship between cause and effects to achieve the objectives is not clear; the relationship
between objectives and performance indicators is not clear or not appropriate; the information
system to capture data for performance indicators is not practical. A practical framework is
proposed as follow:

**The proposed framework**

The definition of an “analyzed area” (AA) of the company is required. The AA can be a
department, a process or a directory: in this article it will be named as an operational area. The
definition of the AA clarifies some important items: (a) the AA has areas or process that use
material, services or information of the AA or “internal clients”; (b) the “internal clients” have
expectations concerning to the AA. (c) on the other hand, the AA uses material, services or
information those come from an internal area or “internal suppliers”; (d) some action plans can be
taken by the AA; (e) some other corrective actions can not be taken by the AA: than the desired
action plan which will be taken by the internal supplier is an “internal supplier’s expectation”; and
(f) “total costs” are costs directed or undirected imputed to the AA.

The proposed framework can be developed in two ways: (a) from the internal client’s expectation
approach and (b) from the AA’s total costs approach.

**Steps for the AA’s Total Cost approach**

1) Define the operational area to be analyzed (analyzed area)
2) Define the total cost of the analyzed area (must have corrective action) (Matrix 1)
   a) Define the performance indicator of the total cost
   b) Compute the current value of the indicator
   c) Define a target for indicator and the time horizon to achieve it
   d) Compute the gap between the current value and the target
3) Define the main costs (Matrix 2)
   a) Define the performance indicators to each main cost
   b) Compute the current value of the indicator
   c) Define the target for the indicator and its time horizon to achieve it
   d) Compute the gap between the current value and the goal
4) To each main cost indicator, define at least one main cause (CSF) related to it (Matrix 3)
   a) Define the operational area that is responsible for each of the elected main causes (internal
      or external)
   b) Define a performance indicator to each main cause
   c) Compute the current value of the indicator
   d) Define the target for the indicator and its time horizon to achieve it
   e) Compute the gap between the current value and the target
5) To each main cause, define at least one action plan (Matrix 4)
   a) Define the operational area which is responsible for each action plan (internal or external)
   b) Define a performance indicator to each action plan
   c) Compute the current value of the indicator
   d) Define the target for the indicator and the time horizon to achieve it
   e) Compute the gap between the current value and the target
6) To each action plan of external operational area, define the expectations of the analyzed area to
   this specific external area (Matrix 5)
7) Send to each external operational area:
   a) The expectation of the analyzed area concerning to the specific external area
   b) The performance indicator to be monitored for each expectation
   c) The current value of the indicator
   d) The target for the indicator and the time horizon to achieve it
e) The gap between the current value and the target

The Figure 3 shows the AA’s Total Cost approach

Steps for the internal clients perspective

1) Ask and define the expectations of the internal clients concerning the analyzed area (must have corrective action) (Matrix 1)
   a) Define a performance indicator for each expectation
   b) Compute the current value of the indicator
   c) Define the goal of the indicator and the time horizon to achieve it
   d) Compute the gap between the current value and the target

2) For each expectation, define at least one main cause (CSF) to achieve the goal (Matrix 2)
   a) Define the operational area which is responsible for each of the elected main causes (internal or external)
   b) Define a performance indicator for each main cause
   c) Compute the current value of the indicator
   d) Define the target for the indicator and the time horizon to achieve it
   e) Compute the gap between the current value and the target

3) To each main cause, define at least one action plan (Matrix 3)
   a) Define the operational area which is responsible to each action plan (internal or external)
   b) Define a performance indicator for each action plan
   c) Compute the current value of the indicator
   d) Define the target for the indicator and the time horizon to achieve it
   e) Compute the gap between the current value and the target

4) For each action plan of external operational area, define the expectations of the analyzed area concerning to this specific external area (Matrix 4)

5) Send to each external operational area:
   a) The expectation of the analyzed area concerning the specific external area
   b) The performance indicator regarding each expectation to be monitored
   c) The current value of the indicator
   d) The target of the indicator and the time horizon to achieve it
   e) The gap between the current value and the target

The figure shows the Internal Clients Expectation’s approach
The case study
More than fifty cases have been applied with more or less success. The authors conducted one case study to demonstrate the applicability of the proposed framework in a factory of stoves.

Steps for the AA’s Total Cost approach
Step 1: The chosen AA was the Die Forging. The Figure 5 shows the total cost deployment and the Figure 6 shows the internal clients and suppliers’ relationship.

An overview of the framework applied in this case study concerning to the Total Cost approach is demonstrated in the figure 7:
Step 2: Define the total cost of the analyzed area (must have corrective action) (Matrix 1)
Step 3: Define the main costs (Matrix 2)

<table>
<thead>
<tr>
<th>Analyzed Area: Die Forging</th>
<th>Total Cost of the Analyzed Unit</th>
<th>Cost Manager Expectation</th>
<th>Total Cost Performance Indicator</th>
<th>Performance Indicator</th>
<th>Current Value</th>
<th>Target</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC</td>
<td>Unitary cost reduction for each part produced</td>
<td>TC / number of parts</td>
<td>TC / number of parts</td>
<td>DLC - Direct Labour Costs</td>
<td>0.07</td>
<td>0.57</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ILC - Indirect Labour Costs</td>
<td>0.07</td>
<td>0.06</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WIP / number of part</td>
<td>0.15</td>
<td>0.13</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sum of the Components</td>
<td>0.09</td>
<td>0.76</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Cost</td>
<td>1.48</td>
<td>1.35</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>gap</td>
<td>44%</td>
<td>3%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 8: Relationship between Matrix 1 and Matrix 2

Step 4: To each main cost indicator, define at least one main cause (CSF) related to it (Matrix 3)
Step 5: To each main cause, define at least one action plan (Matrix 4)
Step 1: Ask and define the expectations of the internal clients concerning the analyzed area (must have corrective action) (Matrix 1)

Step 6: To each action plan of external operational area, define the expectations of the analyzed area to this specific external area (Matrix 5)

Steps for the internal clients’ expectation approach

An overview of the framework applied in this case study concerning to the Internal Client’s Expectation approach is demonstrated in the figure 11:

Figure 9: Relationship among Matrix 2, Matrix 3 and Matrix 4

Figure 10: Relationship between Matrix 4 and Matrix 5
Step 2: For each expectation, define at least one main cause (CSF) to achieve the goal (Matrix 2)

<table>
<thead>
<tr>
<th>Internal Client</th>
<th>Internal Client Expectations</th>
<th>Performance Indicator</th>
<th>Current Value</th>
<th>Target Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly</td>
<td>Deliver parts lots on time</td>
<td>% customers orders on time</td>
<td>80%</td>
<td>60%</td>
</tr>
<tr>
<td>PPC</td>
<td>Reduce the lot size</td>
<td>% lot size reduction</td>
<td>50%</td>
<td>30%</td>
</tr>
<tr>
<td>Quality Department</td>
<td>Produce Parts with Quality</td>
<td>% parts produced with acceptable quality</td>
<td>80%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Figure 12: Relationship between Matrix 1 and Matrix 2

Step 3: To each main cause, define at least one action plan (Matrix 3)

Step 4: For each action plan of external operational area, define the expectations of the analyzed area concerning to this specific external area (Matrix 4)

<table>
<thead>
<tr>
<th>Action Plan</th>
<th>Responsible Dept</th>
<th>Performance Indicator of the Action Plan</th>
<th>Current Value</th>
<th>Target Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement manufacturing cells</td>
<td>Internal</td>
<td>number of manufacturing cells</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Implement SMED</td>
<td>Internal</td>
<td>number of SMEDed equipments / number of planned equipments</td>
<td>10%</td>
<td>50%</td>
</tr>
<tr>
<td>% of reprogrammed lots due to material shortages</td>
<td>Purchasing Dept</td>
<td>% of reprogrammed lots due to material shortages</td>
<td>10%</td>
<td>40%</td>
</tr>
<tr>
<td>% of urgently reprogrammed POs</td>
<td>PPC</td>
<td>% of urgently reprogrammed POs</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Improve training on the work procedures</td>
<td>HR</td>
<td>training hours applied / total training hours</td>
<td>50%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Figure 13: Relationship between Matrix 3 and Matrix 4

Matrix 4 defines the expectation of the AA (Die Forging) concerning to its internal suppliers. Some action plans cannot be able in practice by the AA instead its internal suppliers. A list of these expectations and the correspondent performance indicators must be sent to the operational areas listed in the Matrix 4.
Conclusion

The conclusions of this article are:

The proposed framework is adequate to:

a) Make the performance indicator deployment for operational areas or units
b) Provides a visual check of cause and effect relationship between objectives and performance indicators
c) Be applied in operational areas not related to sales.
d) Provides performance indicators which are really important to monitor an operational area.

Limitations of the proposed tool:

a) Redundant performance indicators
b) Do not provide a mathematical analysis for the gaps (are the action plans sufficient?)
c) Some action plans can be very expensive (increase the total cost)

Bibliography


