



## A Customer-focused Objectives-based Performance Evaluation model for supplier

**Chee-Cheng Chen**

Professor, Management School, Shanghai University, China

&

**Nasim Aman**

MBA Candidate, Management School, Shanghai University, China

### Abstract

This paper proposes a customer-oriented, objectives-based model for evaluating the performance of product supplier and service provider. The study develops an appropriate customer-oriented, objectives-based measurement model for suppliers on conceptual grounds. The paper illustrates the application in the form of a case study of a Taiwanese electronics manufacturer. Satisfactory results are obtained in demonstrating the application of the model. The proposed supplier performance-rating model can be applied by a variety of manufacturers to assess all kinds of supplier in various industries. The proposed model can assist manufacturers in selecting the best supplier and integrating supplier capabilities to develop an appropriate quality-and-profit improvement program using customer-specific requirements.

**Keyword(s):** performance evaluation, customer satisfaction, cost-effectiveness, objective-based, supplier.

### Introduction

Supplier Evaluation is the first steps for effective sourcing. Supplier selection represents one of the most important decisions in a company to remain competitive, especially nowadays, where markets are changing very fast. The increasing competition of globalised business has prompted many firms to improve their supplier/provider as a part of their corporate strategy for cost and service advantages. The purchasing activity determines the most important part of the final cost of the product, for this reason this selection is one of the decisions which determine the long-term viability of the company. The present study proposes a model that incorporates a simple linear-programming weighted-point approach to the solution of the problem of multiple measurements. In doing so, the model takes into account the *total* cost—including net price, delivery costs, quality costs, service costs, and so on. The model then proposes a performance-rating system for supplier's utilising appropriate objectives-based measures from the perspective of customer satisfaction. The utility of the model is then illustrated using an actual case application.

### A Supplier performance-evaluation model

On the basis of the above discussion, the present study proposes a customer-oriented, objectives-based performance-evaluation model for a supplier. The model is presented in the context of an application of the proposed model in a case-study company in Taiwan. The client firm utilising supplier services has manufactured switching power supply (SPS) units for the PC industry since 1970 in northern Taiwan. These SPS products are used as parts in the PC assembly lines of major manufacturers and suppliers—such as IBM, Sony, Siemens, and Hewlett-Packard, all of which have recently set up programs to streamline the supply process.

We are trying to develop a new model by which we are trying to include 6 different indicators. All six indicators were established at various stages in the process. By this new model we can calculate supplier performance better. The indicators which we are trying to include in the model those are below,

\* *Initial stage:* one indicator: 'target price' (Tp); purchasing department responsibility;



- \* *Delivery receiving stage*: two indicators: 'lot reject rate' (Lr) and 'lot delay rate' (Ld); responsibility of department that handles receiving and incoming inspection; and/or production line;
- \* *Production stage*: one indicator 'line complaint' (Lc); responsibility of production line (internal customer);
- \* *Customer stage*: one indicator: 'customer complaint' (Cc); applicable to external customers and customer's customers;
- \* *Overall*: one indicator: 'complaint service' (Cs); responsibility of department that handles incoming inspection and production line;

At year end, the manufacturer assesses the performance of each supplier with respect to materials supplied and sets a suitable performance target value for each indicator (Ld, Lr, and so on).

### Supplier performance measurement

Our study establishes a new model through the integration of six indicators with appropriate weights  $r_1, r_2, r_3, r_4, r_5$  and  $r_6$  respectively. "Performance, P" was obtained by matching "Achievement Level, AL", a range of percentages from "actual value" and "target value" comparisons for each indicator. This system is explained precisely based on the definitions in this study,

Actual Tp → compare with target Tp → get an AL → obtain a "PTp, Tp Performance value" through matching.

The Lr, Ld, Lc, Cc and Cs (PLr, PLd, PLc, Cc and PCs) performance is measured in the same way.

### (1) Value-setting for indicators

#### 1) PTp--Performance of Tp :

Formula:  $PTp = \text{achievement level of target Tp, } AL_n$

1.00= $AL_1$ : Tp lower than target, percentage is higher than 60%

0.95= $AL_2$ : Tp lower than target 41% - 60%.

0.90= $AL_3$ : Tp lower than target 21% - 40%

0.85= $AL_4$ : Tp lower than target 6% - 20%.

0.80= $AL_5$ : Tp equivalent to target +/- 5%

0.75= $AL_6$ : Tp higher than target 6% - 20%.

0.70= $AL_7$ : Tp higher than target 21% - 40%

0.65= $AL_8$ : Tp higher than target 41% - 60%

0.60= $AL_9$ : Tp higher than target, percentage is higher than 60%

This formula is also flexible. Depends on industry and production facility these numbers could be changed and be modified.

#### 2) PCs--Performance of PCs :

Formula:

$PCs = 1$ , when  $Cs=0$

$$= \frac{A'S * 4 + B'S * 3 + C'S * 2 + D'S * 1}{\text{number of corrective action request} * 4}, \quad \text{when } Cs \geq 1$$

A'S: Supplier's response/action is excellent \* times

Return handling is very quick, within one week. The actions taken with detail analysis are effective, significant improvement in the next delivery.

B'S: Supplier's response/action is acceptable \* times

Having significant improving results can be observed in the next delivery, but the response is delayed, longer than one week.



C'S: Supplier's response/action is poor \* times

Only return complaint sheet, no improvement action or actions taken without effectiveness shown in the next delivery.

D'S: Supplier's response/action is not acceptable \* times

No response.

**3) PLc—Lc Performance :**

Formula:

PLc = 1.0, when Lc = 0

PLc = 0.5, when Lc = 1

PLc = 0.0, when Lc > 1

**4) PLr--Performance of Lr:**

Formula:

Same as PTP

**5) PLd--Performance of Ld:**

Same as PTP

**6) PCc--Performance of Cc:**

Formula:

PCc = 1, when Cc = 0

PCc = 0, when Cc ≥ 1

Cc: Customer complaint is caused by released material quality or reliability problem \* times.

**(2) Supplier performance measurement formula**

a) If a supplier supplies just one group of parts, the supplier performance value (PL) will be the same as the supplier performance value (Ps). This value is given by

$$P_L = P_s = 100*(r_1*PTp + r_2*PLd + r_3*PLr + r_4*PLc + r_5*PCc + r_6*PCs) \dots \dots \dots (1)$$

Where

$$r_1 + r_2 + r_3 + r_4 + r_5 + r_6 = 1, \quad r_i \geq 0, \quad 1 \leq i \leq 6$$

b) If a supplier supplies several kinds of products or service (more than one ingredient or service), the PL is obtained using

$$P_L = \frac{P_{L1} + P_{L2} + \dots + P_{Ln}}{n}$$

Where n > 1

c) The parameters in this formula are applied flexibly to cover all kinds of supplier with different characteristics :

For instance:

If a supplier is not suitable for Lr, the parameter weights can be

$$r_1 + r_2 + r_4 + r_5 + r_6 = 1$$

**Results Comparison**

An example is presented to demonstrate how the proposed model, Formula (1), could be applied in a supplier performance rating. The basic manufacturer purchased subassembly data from 3 suppliers (Supplier<sub>1</sub>, Supplier<sub>2</sub>, and Supplier<sub>3</sub>) with different target price. The results from the proposed model, Formula (1), are shown in Tables 1. Significant accurate and effective performance rating results for different suppliers achievement levels were obtained applying the proposed model, Formula (1).



**Table 1: The basic data on manufacturer's purchased material from 3 suppliers (Supplier<sub>1</sub>, Supplier<sub>2</sub>, and Supplier<sub>3</sub>) using Formula (1)**

INDICATOR	WEIGHT	TARGET	MEASURE	SUPPLIER 1		SUPPLIER 2		SUPPLIER 3	
				JAN.	FEB.	JAN.	FEB.	JAN.	FEB.
<b>PTp</b>	0.2	Down 5%	ALn	0.75	0.75	0.85	0.85	0.8	0.8
<b>PLd</b>	0.1	0.50%	ALn	1.0	0.2	1.0	1.0	1.0	1.0
<b>PLr</b>	0.1	1.00%	ALn	1.0	1.0	1.0	1.0	0.2	1.0
<b>PCs</b>	0.2	0	time and quality	1.0	0.5	0.75	1.0	1.0	1.0
<b>PLc</b>	0.2	0	time	1.0	1.0	0.5	1.0	1.0	1.0
<b>PCc</b>	0.2	0	time	1.0	1.0	1.0	0.0	0.0	1.0
<b>TOTAL</b>				<b>95%</b>	<b>77%</b>	<b>82%</b>	<b>77%</b>	<b>68%</b>	<b>96%</b>

### Conclusions

The proposed supplier performance-rating model can be applied by a variety of manufacturers to assess all kinds of suppliers in various industries. The proposed model can assist manufacturers in selecting the best supplier and integrated supplier capabilities to develop an appropriate quality-and-profit improvement program using objectives-based, customer-specific requirements. The proposed model is *complete, flexible, and effective*.