



TenStep Supplemental Paper

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Total Cost of Ownership (TCO)

It is no longer the Stone Age where humans had to start fires by rubbing stones. In the 21st century, man lives in a world dictated by competition and excellence. Severe competition demands supreme performance now. These factors are even more critical to industries that operate in short-lived and volatile markets.

Optimal utilization of resources in such conditions is therefore critical. One issue that bothers most organizations is investment. Given that profit or loss is the deciding factor for industries, expenditures have to be controlled. Since the total investment incurred in trading is multidimensional, the total cost of ownership must be known.

What is total cost of ownership (TCO)?

TCO consists of the costs incurred in the deployment, operation, support and retirement of an asset. Organizations usually do not incorporate costs incurred from warranty and downtime. However, to estimate the true total cost of ownership, these costs must also be considered.

Nevertheless, estimating TCO is not easy. Given so many investments, organizations are often confused about how to estimate TCO accurately. Moreover, calculating TCO is difficult unless the following questions are answered:

1. What is the basis of TCO?
2. What are the difficulties encountered when estimating TCO?
3. What are the advantages of TCO?
4. The absence of which factors render the TCO estimation difficult?
5. Can a TCO model be diverse, i.e. can one TCO model help relate to applications other than what it is designed for?
6. Do organizations use a single TCO in various areas?
7. Is there any interconnection between different cost models?

Supplier reliability – the key to calculating TCO

Most traditional methods of supplier selection, such as *zero based pricing* and *cost-base supplier*, focus heavily on understanding the supplier's pricing structure and also on the supplier's costs in carrying out his business.

Another popular methodology is *Lifecycle costing (LCC)*. LCC deals with capital or fixed assets. The focus is on knowing the purchase cost of the asset and determining how much this asset will actually cost to use, to maintain and to dispose of throughout its lifecycle. Unfortunately, the costs that occur prior to the purchase of the fixed asset do not get adequately captured.



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TCO, on the other hand, is broader in scope, as it includes the pre-purchase costs of an asset with respect to a particular supplier. LCC therefore becomes a part of TCO.

What is the basis of TCO?

Industrialists today are looking for a lot more than just the purchasing investment. They are looking at the total purchasing transaction cost.

Often, commodities/raw materials/spare parts are purchased. Consequently, the supplier/vendor controls the investment to a large extent. Hence, for structuring a TCO model, the purchasing transaction cost (and not just the product costs) has to be calculated. Thereby, purchasing transaction costs form the base for the TCO model.

The advantage of TCO is that it can be applied both to organizations where the product is made (internal) and organizations where the product is outsourced (external). In short, a TCO model is possible both for internal manufacturing and outsourcing.

But why the transaction cost?

Purchasing involves many employees, such as engineers, accountants and purchasing officers, dedicated to improving buyer-supplier relationships. This in turn reduces the purchasing investment. However, the investment required to maintain dedicated employees, who in turn ensure a reliable buyer supplier relationship, is often not considered.

When such investments are encompassed into the TCO model, organizations get the total transaction costs. In short, TCO is an analytical tool based on the purchasing transaction cost to buyer-supplier relationships.

What are the difficulties encountered when estimating TCO?

One of the main factors that limit the application of TCO is its complexity. TCO requires accurate accounting and purchasing investment data that is often incomplete in most organizations. No wonder they believe that TCO is out of their league.

TCO lacks a standard procedure

TCO is not software where organizations can find user documents already written. It is an approach that is customized for organizations. Therefore, there is no standardized approach. Furthermore, TCO models might vary within companies. For instance, the TCO for lubricants in the maintenance department might be different from the TCO for the same lubricant in the operations department. TCOs vary depending on the criticality of the product.

What are the advantages of TCO?

- **Benchmarking.** A TCO model reflects the performance of both the supplier and the organization.
- **Creating opportunities.** It allows the supplier and the buyer to reduce the total cost of ownership and thereby create opportunities for one another.



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- **Improving knowledge.** It improves organization literacy of the purchasing operation. This in turn facilitates efficient price negotiation.
- **Creating a comprehensive purchasing database.** Given that TCO is based on close supplier coordination, it creates a comprehensive cost database that facilitates price negotiation.
- **Long-term benefits.** It focuses on reducing the total cost of ownership and thereby provides long-term benefits to the suppliers and the organization.

A survey was conducted in eleven world-class organizations. This survey highlighted three primary applications of the TCO model:

- Suitable supplier selection
- Evaluation of current supplier performance
- Driving process change/improvements

Six of the organizations adopted TCO for supplier evaluation. Besides this, TCO was used for various purposes such as reducing TCO for a particular commodity, and talking to the supplier about reducing his prices (provided there was potential).

Three of the organizations adopted TCO for evaluating the performance of current suppliers. The secondary objective was using TCO models for driving supplier performance and improvements, supplier selection, and supplier benchmarking.

The last two organizations adopted TCO for a more diverse application, i.e. to drive process improvements. This meant that they did not focus only on the supplier performance or evaluation; instead they looked at the bigger picture – use TCO to select purchasing items and not select suppliers.

Before understanding how these organizations used TCO models, let us first look at the measures required to structure TCO models.

Structuring TCO models

There are two basic approaches to structure TCO models. These are:

- Cash-based
- Value-based

Cash-based

This approach functions by collating information on each cost element that contributes to the total cost of ownership for a specific commodity.

This cash-based approach is similar to activity-based costing. Each cost element contributing to the total cost of ownership is calculated and then added up to get the TCO per unit.

The cash-based approach to TCO allows categorizing the purchasing investment depending on cost elements critical to each commodity. Thus, organizations get a clear



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picture of the TCO for each commodity. Since TCO per unit for the same commodity differs among suppliers, it acts as a supplier evaluation tool.

Advantages of the cash-based approach

- Encompasses every apparent cost element
- Easy to use
- Fairly simple and does not run into complex TCO models
- Gives priority to cost factors as per their criticality
- Extremely user-friendly as it is based on a simple concept
- Ideal methodology for repetitive TCO calculation

Disadvantages of the cash-based approach

- The formula based on which the TCO is calculated has to be constantly reviewed as per supplier behavior
- Requires modifications to the formula if and when a new cost element is considered
- Based on only apparent cost element and is hence not entirely reliable

Value-based

It is easy to construct a TCO model if the accurate data on purchasing investment is available. However, what if organizations have to estimate cost elements that cannot be categorized based on the purchasing investment? In such cases, the value-based approach is more reliable. This approach increases its complexity as qualitative data is converted into quantitative data.

Adopting the value-based approach

The value-based approach functions by transforming invisible cost elements into visible cost elements through a formula – **TCO per unit = [(100 –score)/100] + 1**

What is a score?

A score is an estimation of a cost element based on percentages that contribute to costs.

In short, the supplier performance is based on categories and points allocated to each category. Sample categories and maximum points allotted to them are given below:

- Product quality supplied – 30 points - **P**
- Timely delivery – 20 points - **T**
- Technology at supplier base– 30 Points - **TECH**
- Supplier support – 20 points – **S**

Furthermore, these points are awarded based on percentages. For instance, if the *delivery rate (timely delivery)* is 100% then 100% of the points are awarded to the supplier, i.e. 20 points (Corresponding to T).



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Now, assume the total score turns out to be 90. The total cost per unit would be $[(100 - 90)/100] + 1 = 1.1$, i.e. the total cost factor (TCF)

Once the total cost factor is determined, the actual purchasing investment can be determined as: **price of one unit * total cost factor.**

In this case, if the price of one unit is \$1000, then the cost per unit is $\$1000 * 1.1 = \1100 per unit.

This could not have been possible with the traditional purchasing investment determining techniques. The idea of the value-based approach is to convert invisible cost elements into percentages of visible elements and calculate those costs.

Advantages of the value-based approach

- More reliable, as it incorporates unapparent cost factors
- Allots points to factors based on their criticality
- Suited for repetitive TCO calculation

Disadvantages

- Extremely time-consuming because it involves complex steps
- Preferred only if the calculation is repetitive
- Allotting points based on criticality and so is extremely tedious and complex

Cash-based / value-based – which is superior?

The answer to this question is debatable. If a case were to be conducted in all the eleven organizations that adopted TCO models, one would get a varied response. Preference of the cash-based approach or the value-based approach depends entirely on the organization culture. Neither can be labeled superior. Accordingly, neither of these approaches can be termed as ideal for supplier selection, supplier evaluation or driving changes. This again depends on the organization's perspective towards TCO.

However, if the goal is process re-engineering, then only with a unique TCO model can the purchasing be analyzed. Organizations can then select suppliers depending on their capability and operating costs.

Types of TCO models

The cash-based and the value-based approaches can be used to devise two types of TCO models. These are the *unique TCO model* and the *standard TCO model*.

Why two types of TCO models?

In most organizations, purchasing is repetitive. In such cases, the standard TCO model is ideal. However, if a new item is purchased for the first time, the unique TCO model is recommended.

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TCO helps in supplier selection and assessment

The efficiency of supplier selection and the evaluation process plays a vital role in controlling the purchasing investment. The former selects the right supplier for the right reasons. The latter allows organizations to invest in supplier innovation.

Supplier selection and evaluation – are they different?

TCO models that facilitate supplier selection or evaluation are excellent frameworks for tracking cost factors within organizations. They help in supplier evaluation based on the quality and cost of the supply. Furthermore, by observing TCO models, organizations can also determine:

- The best supplier for a specific raw material
- The volume of business the supplier should be asked for

TCO models for supplier evaluation and selection provide organizations with a forum for communicating vital information to the suppliers.

TCO for driving changes

Supplier selection/evaluation apart, TCO models were used for re-engineering purchasing operations and to drive process improvements by two of the organizations in the study. Given that the TCO model replicated the purchasing activity, it provided information about who was charging more than necessary, who was fairly economical, whose costs were nominal, etc.

Based on these questions, organizations can chalk out supplier innovation and development programs to reduce the purchasing investment.

Why TCO for supplier selection/evaluation?

TCO is essential as an evaluatory tool, be it for supplier evaluation or selection. It provides a reference point, thereby facilitating supplier evaluation. However, what if historical data on the supplier is unavailable (in the case of a new supplier)? TCO estimates the supplier's performance, capabilities, technology overheads and ultimately charges. Based on these aspects, organizations can choose the 'right' supplier.

Evaluate the supplier employees similarly

Supplier evaluation has to be an ongoing effort. It is analogous to how employees are scrutinized. New recruits are constantly monitored and corrected. Based on their performance, they are given incentives. With time, the employees get better, and if not, their service is terminated. Supplier evaluation is akin to employee scrutiny.

From the day a supplier is selected, his performance should be constantly monitored and evaluated. If he is found to be performing at a substandard level, his contract with the organization could be terminated. In short, every supplier might have potential. However, it is only by constant evaluation that organizations decide the feasibility of a long-term relationship with the supplier.



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TCO - more than just a purchasing tool?

Every concept has its own shades of *brilliance* that make it that much more special. TCO is no different. In addition to being a supplier evaluation/selection tool, it is a perfect forum for improving buyer-supplier relationships. By observing TCO models, organizations can see why suppliers are charging more for the supply of specific raw materials.

Once the cause for the high costs is determined, supplier development programs can be organized. Organizations can invest in improving supplier capabilities and reducing the supplier transaction cost.

Keep cost categorization simple

For TCO models to depict ownership costs accurately, cost categorization within organizations must be simple. Furthermore, cost categories can be increased to improve simplicity. Simpler cost categorization simplifies TCO models.

Benefits of using one model for evaluation/selection

Using the same TCO model for supplier evaluation and selection is beneficial in many ways. It reduces the work involved since only one TCO model is required. The evaluation model can be used as a selection model since it reflects supplier performance, which in turn helps in selecting suppliers.

Often, cost dictates performance. Reducing operational costs cannot be achieved by voodoo. It is only through meticulous planning and best practices like TCO that organizations can reduce excess internal and external costs.