Total Cost of Ownership (TCO)

Total cost of ownership serves as a key mean by which to analyse and evaluate indirect costs (van Weele, 2010).

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Introduction

There are many factors that have contributed to organisations adopting a more strategic approach to purchasing and supply management in recent years. For example, these can include a greater need to raise the quality of purchased materials and services, increased global competition and supply base rationalisation (Hurkens et al., 2006).

Purchasing decisions frequently contribute a substantial part of an organisation's total costs. This is true not only with respect to direct acquisition costs but also incorporates indirect costs such as inventory management, quality assurance, administration and payment (Hurkens et al., 2006). For these reasons, TCO serves as a key direct and indirect costs analyses and evaluation method (Ellram, 1993; van Weele, 2010).

TCO shares similarities with concepts such as total cost, life cycle costing and product life cycle costs (Ferrin and Plank, 2002). All of these concepts espouse three ideas: (1) cost must be examined from a long-term perspective and should consider elements beyond initial purchase price; (2) Supply managers ought to consider the impact of other business functions on the valuation of a specific purchase; (3) Accurate purchase valuation requires that supply managers understand and measure the cost impact of all the activities related to the purchase (Ferrin and Plank, 2002).

TCO typically breaks down costs into the following categories: purchase price, as the amount paid to the supplier for the product, service, or capital equipment; acquisition costs which relate to bringing the product, service or capital equipment to the customer's location (e.g. sourcing, administration, freight); usage costs, which refer to converting the purchase into the finished product and supporting it through its usable life (e.g. inventory, conversion, scrap, warranty, installation, training, downtime, opportunity costs); and end-of-life costs defined as the costs arising when a product, service, or capital equipment reaches the end of its usable life, these are obsolescence, disposal, cleanup, project termination costs (Monczka et al., 2009).

Definition

Total cost of ownership (TCO) is a methodology and philosophy that, in addition to the price of a purchase, incorporates other purchase-related costs. TCO approach has become increasingly important as it helps organisations to look for ways to understand and manage their costs better (Bhutta and Huq, 2002). TCO can be defined as "the present value of all costs associated with a product, service, or capital equipment that are incurred over its expected life" (Monczka et al., 2009: 408).

Successful application

There are several considerations a company needs to address before embarking on a TCO analysis. For example, TCO can be costly and time-intensive and may therefore be more suitable for larger purchasing decisions. As with all major decisions, it is important to secure senior management buy-in (Monczka et al., 2009). In addition, effective organisational structures should be established in advance to support the analysis and reduce the time needed to collect data (Monczka et al., 2009). Finally, there is no one best way to implement TCO analysis. See Monczka et al. (2009), van Weele (2010), Bhutta and Huq (2002) and Hurkens et al. (2006) for more details on the processes and the way TCO can be implemented. Another seminal paper on TCO was published by Ellram in 1993.

Steps to successful application

1. Map the process and develop TCO categories: build a process map from the time that a product, service or capital equipment need arises right through the life cycle. This helps to identify and develop broad TCO categories.
2. Estimate cost elements for each category by using the process map to identify the subcost elements that comprise each TCO category.
3. Determine the metrics to quantify each of the cost elements identified in the previous step (e.g. labour sourcing costs, the individual hourly rate of performing sourcing activities, the amount of time spent or that will be spent).
4. Gather data for each identified metric identified in the previous step and quantify the costs accordingly. Collect information from various sources (e.g. interviews, surveys, other internal databases).
5. Construct a cost timeline for the length of the life cycle by placing each cost element quantified in the previous step in the appropriate time period and calculate totals for each time period.
6. Bring costs to present value: compute the present value to allow decisions to be made based on present currencies. The value of money spent in the future depends on the firm's capital costs. The sum of present values for each time period represents the total cost of ownership.

Hints and tips

Under the make-or-buy decision principle, TCO should primarily be used following the decision that the organisation will buy rather than produce a product or service (Bhutta and Huq, 2002).
It is important to ascertain a realistic estimate of the life cycle because both underestimation and overestimation lead to incorrect decisions (Monczka et al., 2009).
Gathering data and quantifying costs is the most difficult and time-consuming implementation step. Therefore, it is important to ensure that sufficient time and resources are allocated to this stage.
When gathering data and quantifying costs it is important to validate the numbers if relying on information obtained from internal databases. This is due to inaccuracies resulting from input errors (Monczka et al., 2009).

Potential advantages

- Focusing on both direct and indirect costs, TCO is an important tool supporting a more strategic focus on purchasing and supply management (van Weele, 2010).
- TCO is a useful decision-making tool as it can be employed to select and evaluating suppliers (Bhutta and Huq, 2002).
- TCO can be used to identify improvement areas for preferred suppliers by introducing a limited number of key performance indicators that have a significant impact on the TCO of supplier offerings (Hurkens et al., 2006).

Potential disadvantages

Most practitioners and academics concur that TCO analysis is a time-consuming and complex process (Bhutta and Huq, 2002).
TCO requires extensive tracking and maintenance of cost and financial data (Bhutta and Huq, 2002).

There is a risk that sourcing decisions are based on incomplete information when data lacks integrity or when real-time data are unavailable (Phillips and Melnyk, 2010).

Performance monitoring

Present value: calculation of the present value of each total in the cost timeline by using a present value table or financial calculator. The cost of capital can be obtained from the finance department (Monczka et al., 2009).
A value proposition: functionality/total cost of ownership (CIPS Australia, 2007).
Net present value (NPV): the net present cost of the purchase or project and all future revenues flowing from it discounted back to the present time. Numerous allowances should be taken into account, for example, the value of the purchase, project at the end of its useful life (CIPS: Whole life costing).
Return on Capital Employed (ROCE): a fundamental ratio for determining the success of an enterprise or project represented by the formula R% = Pr x 100 / Cap where R% is the percentage return generated by the capital employed; Pr is the profit generated before tax; and Cap is the average capital employed (CIPS: Whole life costing).
Internal Rate of Return (IRR): a percentage discount used in capital investment projects brings the cost of a project and its future cash inflows into equality (CIPS: Whole life costing).

Case studies

- Suncor Energy, a US energy company, relied on TCO principles and a life cycle approach to unify key service suppliers and different Suncor groups as though they were one company. A 2003 cost study which followed the application of the technique showed that the company reduced drilling costs by 18%, planning times by 42% (5 months) and drilling times by around 20% (Monczka et al., 2009).
- TCO was used to assess the total costs incurred by a large US multinational company when outsourcing some of its items to China. A pilot TCO analysis revealed by backsourcing (moving internal manufacturing to the US) would allow the company save US$490,000 annually (Phillips and Melnyk, 2010).
- In 2002 Dairy Crest commenced a project to save 5% (£15m) on indirect costs involving 400 users across 16 sites, before moving on to the purchasing analysis of dairy products. The company relied on e-Procurement to control and monitor purchases (Supply Chain Standard, 2004).

Further Resources/Reading

Web

TCO and travel purchases.

TCO of Stackable Switches.

TCO and outsourcing decisions example.

TCO in services centre.

TCO as a tool to disclose the extra costs of buying funds (Financial Times)

Books

Purchasing and Supply Chain Management ISBN 978-1408017449

Managing Global Supply and Risk: Best Practices, Concepts, and Strategies ISBN 978-1604270143

Supply Chain Management: Concepts, Techniques and Practices: Enhancing the Value Through Collaboration ISBN 978-9812700728

Purchasing and Supply Chain Management: Analysis, Strategy, Planning and Practice ISBN 978-1408018965

Strategic Procurement: Organising Suppliers and Supply Chains for Competitive Advantage ISBN 978-0749460228

References

Bhutta, K.S. and Huq, F. (2002) Supplier Selection Problem: A Comparison of the Total Cost of Ownership and Analytic Hierarchy Process Approaches. Supply Chain Management: An International Journal, Vol. 7(3), pp. 126-135.

CamfilFarr. Air Filtration: Total Cost of Ownership. [online] Available at: www.camfilfarr.com/Global/Documents/US/Literature_Library/Case_Study_-_TCO_-_Hospital_-CH.pdf [Accessed 20 December 2011].

CIPS Australia (2007) Benchmarking: So How Are We Doing and Where Do We Want To Be? The Knowledge Club, Iss.5, March. In The Knowledge Club Compendium, Iss. 5-8.

CIPS: Whole Life Costing.

Ellram, L.M. (1993) Total Cost of Ownership: Elements and Implementation. International Journal of Purchasing and Materials Management, Vol. 29(2), pp. 3-11.

Ferrin, B.G. and Plank, R.E. (2002) Total Cost of Ownership Models: An Exploratory Study. Journal of Supply Chain Management, Vol. 38(3), pp. 18-29.

Hurkens, K., van der Valk, W. and Wynstra, F. (2006) Total Cost of Ownership in the Services Sector: A Case Study. The Journal of Supply Chain Management, Vol. 42(1), pp. 27–37.

Monczka, R.M., Handfield, R.B., Giunipero, L.C. and Patterson, J.L. (2009) Purchasing and Supply Chain Management. South-Western Cengage Learning: Mason, OH.

Phillips, C. and Melnyk, S. (2010) East May Not Be Best. Supply Management. [online] Available at: www.supplymanagement.com/analysis/case-studies/2010/east-may-not-be-best/?locale=en [Accessed 20 December 2011].

Robinson, J. (1996) Plant and Equipment Acquisition: A Life Cycle Costing Case Study. Facilities, Vol. 14(5/6), pp. 21-25.

Supply Chain Standard (2004) Route Map to the Promised Land. [online] Available at

www.supplychainstandard.com/liChannelID/29/Articles/659/Route+map+to+the+promised+land.html [Accessed 20 December 2011].

Supply Management (2004) Costs in the Round. [online] Available at: www.supplymanagement.com/resources/knowledge-zone/2004/costs-in-the-round/?locale=en [Accessed 20 December 2011].

van Weele, A. (2010) Purchasing and Supply Chain Management: Analysis, Strategy, Planning and Practice. Cengage Learning: Hampshire, UK.

Video

Total cost of ownership example
https://www.youtube.com/watch?v=ftOsm_rIflg

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