Developments in Practice XXXVII: Total Cost of Ownership

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Abstract:

Total Cost of Ownership (TCO) advocates for a holistic view of IT costs across the enterprise over time, grouped into a series of direct and indirect cost elements. Knowing the full costs allows organizations to make optimal decisions regarding the enhancement, retirement, renewal, and/or replacement of critical IT assets. The authors convened a focus group of senior IT managers who were asked to describe their firm's adoption of TCO, TCO processes, tools to assist with TCO implementations, the effectiveness of these tools, and the governance practices which guide their TCO processes. The group concluded that TCO, despite facing significant implementation challenges, remains a concept worth pursuing. This article reviews current literature, summarizes the focus group discussion, and offers practical guidance for those IT managers considering adopting TCO.

Keywords: K full costs, direct costs, indirect costs, IT asset evaluation, lifetime costs, cost-benefit evaluation

I. TOTAL COST OF OWNERSHIP

As businesses become increasingly enabled by information technology (IT), there is a need to link IT expenditures directly to business activities in order to enable business decisions based on the true costs of doing business. The common response by many firms is to adopt a chargeback mechanism that allocates IT expenses to individual lines of business according to usage. These allocation strategies, however, struggle with issues of granularity (i.e., the level of detail reflected in the charging algorithm), overhead (correctly apportioning IT management contributions), categorization (development versus maintenance), pricing (setting appropriate internal transfer rates for services), technology life cycle (costs are affected by technology phase), and depreciation (fully depreciated costs versus replacement costs). From the business point of view, receiving an aggregated and nebulous usage charge for IT services does little to help managers truly understand their costs.

In 1987, Bill Kirwin of the Gartner Group developed a methodology for capturing the full costs of owning and managing an IT asset and coined the phrase *total cost of ownership* (TCO). The methodology captured both direct and indirect costs and highlighted their difference by demonstrating that PCs were costing enterprises nearly $10,000 per year—thereby causing an "upheaval among financial managers and IT directors" [12manage, 2009]. While TCO does not solve all of the problems with chargeback mechanisms (nor does it purport to), it does introduce new elements into the analysis and offers a different framework for recognizing and reporting IT expenditures as a basis for management decision making.

Interestingly, TCO as a business concept has only been around for a couple of decades, but it's an idea that librarians have understood informally for centuries.

> *When a patron loses a book, most libraries charge more than the cover price of the book, because the cover price doesn't include the cost of ordering, processing and cataloging the book. The staff time involved in getting that book into the system is part of the TCO of that book. If you look out even further, there are costs related to shelf space, repairs, circulation, reshelving and deaccessioning. Cars, houses, pets, children—there's a TCO associated with just about everything, and computers are no exception.*
>
> *The MaintainIT Project,* 2009

According to one author, TCO all comes down to free kittens. "When someone hands you a kitten for free, there's likely hidden charges that soon turn the $0 into $$$. There's food, there's medical bills, there's toys, there's soft and cushy beds, there's scratching posts, there's new sofas to replace now that you bought the scratching post … the list goes on and on" [Montgomery, 2008].

To explore how organizations are approaching TCO for IT, the authors convened a focus group of senior IT managers from a variety of different companies representing several industries including manufacturing, insurance, consulting services, banking and finance, food processing, pharmaceutical, government, retail, and telecommunications. Group members were asked to focus their discussion of TCO on business applications. Capturing the full life-cycle costs of prospective applications[1] incorporates the whole gamut of IT resources including hardware, software, support, overhead, shared services, development, operations, and retirement. We were also interested to know about existing applications and how TCO is being used to evaluate which applications to retain, retire, and/or refurbish.

In preparation for the meeting, focus group members were asked to respond to a number of questions exploring their firm's (1) adoption of TCO, (2) the TCO processes they have instituted, (3) any tools to assist with TCO implementations, (4) the effectiveness of these tools, and (5) their governance practices which guide these TCO processes. The group was sequestered for an entire day and the discussion was moderated by one of the authors while the other author recorded the discussion. The remainder of this article represents a summary of the focus group discussion.

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[1] Prospective applications are often referred to as "projects" or "development projects." Once implemented, these projects are usually referred to as "applications."

II. THE TCO CONCEPT

The TCO concept is not new, nor was it new in 1987. It has its roots in life-cycle cost analysis[2] and full cost accounting[3] which are both systematic accounting approaches that seek to evaluate all costs associated with a product or practice. The goal of a TCO approach is to fully account for current and anticipated future costs to enable good business decisions about how to deploy capital or manage existing assets. What was new in 1987 was the application to IT. Today, the term TCO is broadly accepted as specifically related to IT investments. According to one focus group member, "TCO tries to characterize the full financial impact of deploying or retaining assets over the entire life cycle of that asset. For an IT organization this would typically apply to two types of assets: business applications and IT infrastructure."

According to Silver (2007), the fundamental basis of TCO is that it represents a holistic view of IT costs across the enterprise over time, grouped into a series of direct and indirect cost elements. *Direct* costs comprise the "capital and labor costs associated with operating the IT asset, as well as the administration and education costs and fees paid for external services." *Indirect* costs are "labor costs associated with end-user operations in a business unit or department and the downtime involved." Research cited by Silver [2007] suggests that, for the average enterprise, "indirect costs may contribute 50% or more to overall TCO." While this research originally focused on desktop and notebook PCs, it is possible to extend the TCO concept to other IT investments such as servers, applications, and networks.

According to one member of the focus group, "direct costs are the obvious ones, while indirect costs can be more important, albeit harder to agree on or quantify." Examples of indirect costs include the cost of service outages, security breaches (e.g., loss of reputation and recovery costs), disaster recovery needs, or poor quality of service. While direct and indirect costs appear to be distinct, in fact, they are closely interrelated, as illustrated by the following example given by the same focus group member:

Suppose the service level of an application is reduced, for example, in order to save direct costs in infrastructure and support. This reduced service level may indirectly lead to even larger increased business costs or revenue loss—so that the larger indirect costs actually lead to an overall increase in TCO.

The conclusion reached by the focus group was that a proper TCO analysis requires visibility of both direct and indirect costs as well as their dependencies.

Since TCO is based on a generic costing approach, it can be applied to any IT investment. For instance, TCO could be used for hardware (e.g., desktops, printers, servers, networks), software (e.g., licensing, purchase, integration), applications (e.g., development, support, operations), or shared services (e.g., planning, enterprise architecture, disaster recovery planning, security, compliance). Existing applications of TCO that have been reported in the literature include:

- Desktop/workstations (e.g., David et al, 2002)
- ERP systems (e.g., Jutras, 2006)
- Total IT investment (e.g., Brynjolfsson and Hitt, 2000)
- System software (e.g., Cybersource, 2004)

The benefits of TCO include a consistent, systematic framework for comparing IT alternatives; increased productivity and reduced total cost over time; a standardized way to track and compare IT costs over time; and education and raised awareness about the full costs of IT, showing that the initial IT procurement cost is a relatively small part of the full cost of ownership.[4] As such, the promise of TCO is to provide a "clear line of sight" to the full cost of alternate decisions and thus enable management to make better, more informed decisions regarding IT investments.

Specifically, TCO provides two opportunities to improve operations:

1. *Optimizing budget allocations.* With a more complete picture of costs, it is easier to make better decisions about where to invest available dollars. For example, organizations may be less likely to defer

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[2] Life-cycle cost analysis is usually applied to long-lived assets (such as buildings) to demonstrate the tradeoffs between spending more initially (e.g., additional building insulation) and net savings (due to reduced heating and cooling costs) over the building's lifetime [Federal Electronics, 2007].
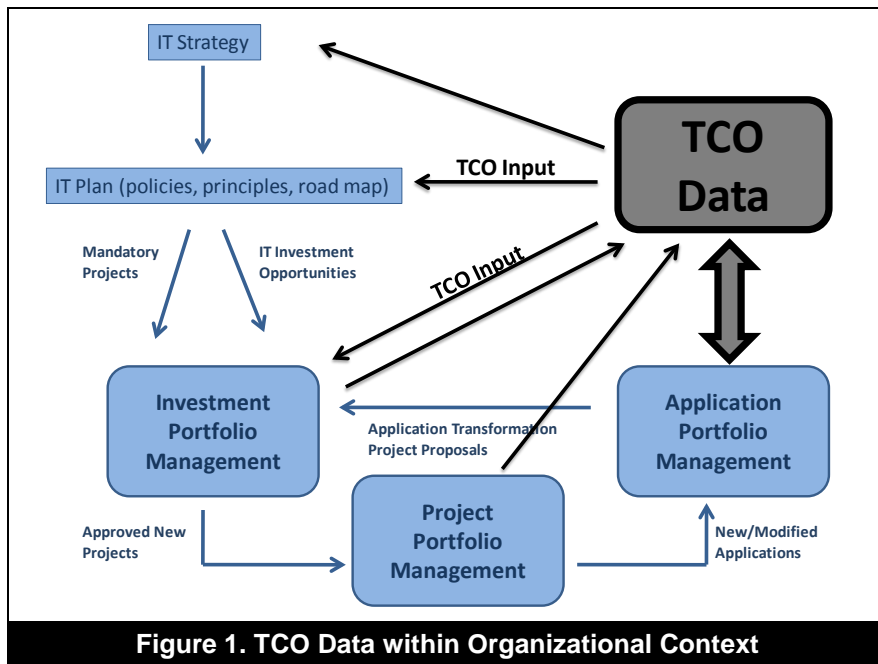
[3] Similar to life-cycle cost analysis, full cost accounting is typically used to evaluate ongoing programs. Using full cost analysis for solid waste management, for example, enables a municipality to account for the avoidance of disposal costs associated with recycling [Federal Electronics, 2007].

[4] This is especially relevant for energy saving approaches, referred to as "green IT," where additional initial costs may result in substantial future savings.

maintenance investments if the indirect cost increases (through decreased productivity) are visible. Unfortunately, this capability is lacking in many organizations. According to one focus group member, "*annual planning does not identify the ongoing 'after delivery' cost of applications but instead focuses on the business case of individual projects."*

2. *Providing important input into IT planning and asset management.* When you know the direct and indirect costs of applications/assets and can project these forward in time, you can do a better job of planning out future assets—enhancement, retirement, renewal or replacement—with a clearer understanding of costs and benefits.

Figure 1 demonstrates how TCO is integrated within existing organizational processes. For instance, application portfolio management (APM) captures data to identify asset improvements, manage asset usage, analyze and assess value, and asset retirement. According to the focus group, APM can be easily modified to create and capture application-level cost data to support a full TCO analysis; that is, data that differentiates direct (infrastructure/ operational and application/platform) and indirect (application/platform, risk-related, and end-of-life) costs of specific applications. Figure 1 also demonstrates how the TCO data informs strategy formation, IT planning, and ultimately investment portfolio management by enabling analyses based on total life-time costs of applications (see "TCO inputs"). In addition, Figure 1 (see "TCO updates") shows how investment development decisions (i.e., investment portfolio management and project portfolio management) affect the existing application portfolio and how these changes must be reflected in the application TCO data.

Figure 1. TCO Data within Organizational Context

III. THE IMPETUS FOR TCO

Benefits aside, an interesting question is why there is such pronounced interest in TCO. According to the focus group, IT organizations are facing four acute challenges and collectively these challenges are driving their interest in TCO:

1. *Managing IT costs effectively.* IT organizations are continually under pressure to meet greater demand for IT services with reduced funding. In looking for opportunities to respond, IT organizations often find themselves in the midst of decision making with incomplete or inaccurate information with respect to basics (e.g., What are we doing? What should we be doing? How are we doing? Where can we make improvements?). Therefore, greater cost transparency is required to streamline IT operations, reduce redundancies, and improve the accuracy of planning and budgeting.

2. *Supporting business cases.* In most IT organizations, the work to support business cases for new or enhanced technology is done on a "one-off" basis and then thrown away once complete. Hence the length of time and resources consumed to complete this task is extraordinary. As one manager explained, "we don't reconcile the sum of the parts" and, therefore, fail to recognize and capture the full cost impact of new business initiatives.

3. *Explaining IT charges to the business.* Business managers need to understand the full costs of doing business to enable them to manage and influence these costs and have adequate information to decide on alternative courses of action. The inability to benchmark IT costs and services, let alone explain these costs satisfactorily, often leads business managers into inappropriate outsourcing arrangements and "do it yourself" technology management.

4. *Justifying technology strategies.* IT organizations must be able to defend their strategies for consolidation of resources and rationalization of technologies in order to reduce redundancies and improve delivery of services. Without adequate cost transparency, these strategies are difficult to defend and justify.

These four challenges outline why IT organizations are increasingly being called to link their activities directly to business practice, explain the differences among technology alternatives in terms that are meaningful to non-IT executives, and justify decisions on a solid financial basis. One focus group member summed it up by claiming that "today, the IT organization is expected to run itself like a business."

IV. CONCEPTUALLY EASY … PRACTICALLY IMPOSSIBLE

There is little argument with the TCO concept. It makes absolute sense for organizations to understand and articulate the full costs of their IT investments—no rational organization would suggest otherwise. Where the challenges arise, however, are with the implementation of TCO. What appears straightforward and logical from a conceptual point of view soon proves otherwise at a practical implementation level—another case where the "devil is in the details."

The first implementation challenge arises due to the sheer number and type of costs involved in a typical IT deployment. Depending on circumstances, the focus group members identified a number of different costs which could all potentially be included in a TCO formula. These were organized into the following four categories:

1. One-time (start-up) costs
   o end-user computer hardware purchase costs
   o software license purchase costs
   o hardware and software implementation/deployment costs
   o operations infrastructure costs
   o network hardware and software costs
   o server hardware and software costs
   o testing costs
   o technology training costs of users and IT personnel
2. 2. Ongoing (lifetime) and enhancement costs
   o hardware warranties and maintenance costs
   o software license tracking costs
   o operations infrastructure costs
   o infrastructure (floor space) costs
   o cost for electricity and cooling
   o network hardware and software costs
   o server hardware and software costs
   o backup and recovery process costs
   o cost to upgrade or scalability
   o costs incurred to integrate with other applications
   o audit costs
   o insurance costs
3. Ancillary costs
   o IT personnel costs
   o "C" level management contribution
   o costs associated with failure or outage
   o diminished performance incidents (e.g., users having to wait)
   o costs of security breaches (e.g., loss of reputation and recovery costs)
4. One-time (end-of-life) costs
   o replacement costs
   o migration costs
   o decommissioning costs

While all of these costs may be part of a specific IT deployment, many are also shared among other deployments, so the difficulty is with allocation as well as identification. As one member of the focus group asked, "can you realistically break down network or telephony charges to a specific application?"

The second implementation challenge arises because of the way IT investments are vetted by organizations. Consider the following hypothetical example where a business case is prepared to demonstrate the benefits of

automating a manual procedure. The resulting business application may entail the acquisition of new hardware, software, forms, and procedures which require a new training program. Furthermore, the data from the old system might have to be converted and ported over to the new system; new backup provisions might be deemed necessary; and additional personnel may need to be hired as new skills become necessary to develop and/or support this new application. As a result, the TCO concept becomes extremely complex and unwieldy because of the challenge of applying it consistently at a business application level. Further complicating the situation is the fact that many new business applications necessitate changes to other existing applications with which they must interface. The changes to these applications must then be reflected in their own TCO calculations. The result is a series of cascading effects radiating out from the target business application.

The third implementation challenge relates to the real focus of TCO. As far as business is concerned, its interest lies less in business applications than in providing services to customers. A business/customer service provided by a bank, for example, might be the "initiation of a new mortgage." Initiating a mortgage would invoke a number of different applications (e.g., customer initiation, credit validation, account registration, and/or regulatory compliance reporting). So, for the business manager, the need is to understand, not the total costs of a specific application, but the total cost of providing a specific service. For example, what does it cost a bank to create a new deposit account? Or what does it cost a retailer to restock an item in a store? Ultimately managers need to know the true costs of running the business. The relationship among customer services, business applications, and platform infrastructure is depicted in Figure 2. The members of the focus group suggested that their ability to assess TCO accurately depends on the focus; that is, for infrastructure assets, costs tend to be "well-known," for business applications, costs are "less well known but reasonably apportioned out to the business," and finally, for business services, costs are "best guesses."

Figure 2. TCO by Category
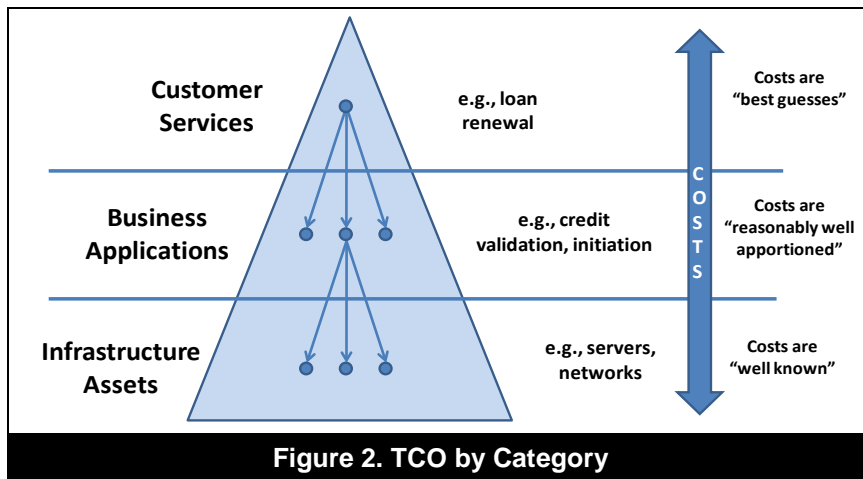
The conclusion reached by the focus group was that striving for perfection with TCO is folly. Implementing TCO will necessarily involve a tradeoff between granularity, accuracy, and control. Increasing granularity improves accuracy but requires increased resources to administer; decreasing granularity reduces the TCO effort required, but sacrifices accuracy; and controlling who provides and stewards this information impacts the overall costs of the TCO initiative. In the next section of the article, we examine where and how these tradeoffs come into play.

V. TRACKING AND ALLOCATING COSTS

In order to be managed, TCO costs must be understood and articulated. A logical approach is to consider TCO costs over the life span of an application. Table 1 shows typical application costs broken into three life-cycle phases: acquisition and procurement; operations and maintenance; and end-of-life management.

Examining costs over life-cycle stages highlights how costs change over the lifetime of an application. Stage 1 (acquisition and procurement) and Stage 3 (end-of-life management) costs tend to be application-specific, and, as a result, they can be attributed to a specific application in a relatively unambiguous fashion. For example, purchasing a license, leasing a server, or decommissioning a harddrive are activities with well-defined costs. Stage 2 costs tend to be more difficult to assign to a specific application as many of these costs are shared across many applications (e.g., energy costs, administrative costs, and network costs). The danger here, as described by one focus group manager, is that

Costs are typically low after implementation but eventually rise as the application ages and starts to not directly match the needs of the organization. Costs can increase as you find increasing need to do new development on the application, pay for increasingly expensive currency upgrades, find the need to integrate with other applications, provide improved/more expensive business continuity, and insure against outages. Often invisible in this is the increasing indirect costs, as the assumptions of "indirect costs" made when the application was implemented, become less and less true.

Table 1: Typical Application Costs by Life-Cycle Stage

Life-Cycle Stage	Typical Costs	Examples
Acquisition and Procurement	Administrative costs	Developing bid specifications, preparing RFPs and RFIs, evaluating proposals, gathering and analyzing data, budgeting, and negotiating
	Evaluation	Researching options to upgrade, lease, and/or purchase options
	Contract management	Tracking purchases, relationship management and oversight, transfer and delivery
	Hardware	Purchase/lease of servers, desktops, peripherals, storage, networking, and other related equipment
	Backup	Business continuity planning, spare systems, parts and materials, plus disaster recovery planning
	Software licenses	Payment procedures, verification, administration
Operations and Maintenance	Administrative costs	Contract management, asset management, overseeing contractor services, a share of human resources, and other operating costs
	Training IT staff	Vendor-contracted, in-house delivery personnel, ongoing skills development
	Supporting users	Consulting, training, and help desk support
	Technical support	Product maintenance, database management, network management and software management
	Retooling to accommodate new hardware and software	Change control procedures and oversight activities
	Software and hardware versioning	Upgrades, roll outs, planning, changeover events and communications
	Fixed allocations	Share of floor space, furniture, real estate leases, other fixed office costs
	Internet and other network access costs	Share of direct and indirect networking infrastructure costs
	Energy costs	Electricity plus heating/cooling costs including HVAC
	Informal self-support	User-formed help sessions, ongoing Q&A support
	Down time due to hardware/software malfunctions and/or user errors	Costs of delays and lack of service associated with outages
End-of-Life Management	Administrative costs	Asset management, inventory management, vendor contract management, and invoice payment=
	Staging	Removing and consolidating equipment
	Sanitizing hard drive and other storage media	Sweeping and erasing data storage media
	Testing and/or preparing for reuse	Repurposing hardware, reloading hard drives, transferring ownership
	Providing follow-on support to employees or others purchasing used equipment	Implementation and conversion activities and training
	Recycling/disposal fee and/or outsourcing fee	Costs associated with decommissioning, disposal and special contract closure fees
	Physical shipping and delivery	Transportation costs, shipping and handling, verification of delivery
	Value of sold products and materials	Final accounting for asset

The bottom line is that applications are long-lived and spend the bulk of their lifetime in the maintenance and operations phase where costs are difficult to apportion to specific applications. As a result, IT organizations can find themselves with increasing application costs but unable to determine the true source of these costs due to the large indirect costs (e.g., costs of a secure environment or costs of Tier 1 support). Furthermore, this situation is unlikely to be easily remedied, as most IT organizations are project-based as opposed to application-based; that is, they fund "projects" that work on many different "applications," making it difficult to allocate these costs to individual

Communications of the Association for Information Systems

applications after the fact. One focus group manager described this as the "catch-22" for most organizations—"there is no need to track or report individual application maintenance costs … but there is an increasing demand to reduce maintenance cost overall"!

VI. RECOMMENDED STRATEGIES

Based on their experiences, focus group members articulated four strategies which they believe would contribute to the successful deployment of TCO initiative.

1. *Link TCO to a pain point.* A TCO initiative is a costly undertaking, and organizations need to be convinced that the resource demands are offset by the benefits. Where and how these benefits are derived, however, depends on the problem that the TCO initiative is attempting to solve. As a result, a TCO initiative should be focused on a "pain point." According to one member of the focus group, the impetus for her organization's interest in TCO was the business' frustration over a lack of understanding and transparency regarding IT expenditure decisions. The business questioned the IT organization's allocation of over 40 percent of the total IT expenditure to "maintenance and technical currency."[5] The business considered this a "big, black hole into which IT dollars were poured." The business did not understand these decisions and had no control over them. They felt that a TCO approach would bring clarity to the true costs of IT and the ability to apportion costs to various applications and lines of business much more accurately. In another organization, the CFO had introduced TCO models for *all* major assets. Regardless of the impetus, the focus group felt that the lack of a clearly defined mission would jeopardize any TCO venture from the outset as it requires significant resources. Having a specific target justifies a TCO's existence and can often provide a source of quick wins.

2. *Establish a TCO office.* Someone must take ownership of the TCO initiative. Furthermore, TCO must become firmly established within the organizational hierarchy and recognized for the role that it plays. The focus group used the analogy of a project management office (PMO) structure. Like a PMO, they recommended that a TCO office be created to define and maintain the standards and methodologies for undertaking a total cost of ownership process. This office would be the source of documentation and metrics on the practice of TCO and would guide its execution across the organization. Over time, significant TCO expertise would be developed within the TCO office such that it could be disseminated across the organization. A viable home for the TCO office would be the finance department given its established credibility in cost evaluation. Alternatively, the home for the TCO office could be within the IT organization. One focus group member suggested that a key challenge is maturity level. He argued that "most organizations need to reach a level of financial sophistication before it makes sense for them to tackle TCO."

    A key element of the establishment of a TCO office is governance. Similar to a PMO, a decision must be made regarding the organizational exposure of the TCO office: enterprise TCO, organizational (department) TCO, or special-purpose TCO. This decision would normally be made based on the genesis of the TCO initiative, that is, the "pain point" mentioned above. However, the members of the focus group felt that the realized benefits of a TCO initiative would be greatest at an enterprise level. To this point, one organization had launched a full TCO pilot project within a specific area of the organization. Their strategy was to "start focused" and "scale up" if/when successful. Taking a different approach, another company began an organization-wide initiative to capture the application level data to support a TCO exercise by piggy-backing on its successful application portfolio management (APM) initiative at the enterprise level.

3. *Capture TCO data at key life stages.* It is a mistake to wait to capture TCO data when applications are already in production. Data should be captured at multiple stages—when an application is first approved, in testing, when it enters production, each time significant modifications are made, and when it is retired. As soon as data is captured and made available, the organization can benefit. For example, knowing the attributes of applications under development can be valuable for planning/budgeting purposes and ultimately enables better project solutions (see Figure 1).

    As previously stated, there are three key inter-related dimensions of TCO data: granularity, accuracy and control. Collectively, these dimensions will dictate the implementation and ongoing costs of a TCO initiative. The focus group suggested that, for each TCO data item, three questions should be addressed:

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[5] "Maintenance and technical currency" is the work needed to keep applications, data, and the IT environment and production data in good repair and not obsolete. Technical currency includes upgrades enforced by vendors and any upgrades deemed to be nondiscretionary for production. Maintenance projects include work required to "keep the lights on" and development work needed to keep data current, relevant and useful to the business. This category also covers maintenance performed by external vendors and license fees. Work is recommended by IT based on operational risk factors, such as the company's critical systems list and identification of applications going out of support.

a. For what purpose will the data be used?
b. How will the data be captured/measured?
c. Who will act as data custodian?

Knowing why the data is being collected, how it is being collected and who is responsible ensures that the data will be kept current. While this sounds straightforward, organizational inhibitors exist. One member explained the realities of his organization as follows: *"Maintenance line items are 'buckets' that cover work on many different applications making it hard to decompose into application-specific costs. Our two line items for maintenance cover 85 applications! Otherwise, everyone would have to record their time against 85 line items/projects/applications."* Thus, the ramifications of decisions about TCO data capture must be considered carefully.

4. *Invest in TCO management tools.* The effort involved in adopting a TCO approach is enormous. Two organizations in the focus group had made significant investments in tools to support their TCO initiatives. Both sets of tools were "hand-crafted" as off-the-shelf tools were not available. Their tool sets offer a number of features including the following:

a. Enabling data capture at source (e.g., prorates shared services like disaster recovery across applications)
b. Categorizing application data (e.g., direct versus indirect costs, tier 1 versus tier 2 support)
c. Automation of business case preparation (e.g., NPV calculation)
d. Tracking detailed costs for all infrastructure components (e.g. fixed, variable, semi-variable)
e. Tracking capabilities to realize benefits by application
f. Reporting and analysis capabilities (e.g., cost per application, per LOB, changes over time, cost, and number of users per application or per platform)

Both organizations have realized substantial benefits from adopting TCO and attribute much of this benefit to their tool sets. Benefits include:

a. Improved cost management—tracking financial benefits and costs outlined in business cases has achieved not just cost management but benefits management.
b. Improved Partnership with the business—the business-IT relationship has been improved because of IT's ability to explain its costs and tie them directly to business activities.
c. Improved strategic decision-making—the TCO effort has led to application rationalization programs, not only reducing costs, but also reducing complexity and increasing customer centricity. For example, tracking desktops across the enterprise led one firm to adopt standard images which resulted in a savings of $14 million annually.
d. Improved cost transparency—making the costs of IT applications transparent enables the business to make informed technology-based decisions (e.g., knowing what is fixed and what is variable and the tradeoffs between levels of application support)

VII. CONCLUSION

This article, based on the collective experience and insights of senior IT managers from a number of leading organizations, provides guidance to those investigating TCO and/or planning to launch a TCO initiative. TCO, as it applies specifically to information technology, promises significant benefits to adopting organizations. Key among these benefits is the ability to improve IT operations by optimizing budget allocations and by providing important input into IT planning and asset management. As a side benefit, providing a window into the total cost of ownership of IT enables management to understand how IT impacts the business—not only from the cost side but from the benefits side as well. Thus TCO addresses the lingering doubt harbored by many senior managers that IT fails to deliver what is needed by the business and at a reasonable cost. Adopting TCO, however, is resource-intensive and needs to be justified and planned effectively. This article outlined several strategies for how to do just that.

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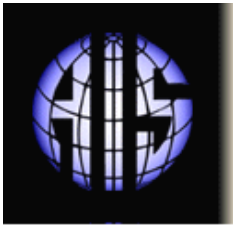
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