# A HARD AND SOFT LOOK AT IT INVESTMENTS

**Jed Dempsey, Robert E. Dvorak, Endre Holen, David Mark, and William F. Meehan III**

*It's getting tougher and tougher to calculate costs and estimate benefits*

*No methodology can substitute for judgment*

*A new approach: total value of ownership*


THROWING GOOD MONEY AFTER BAD would make any manager uneasy. But then, uneasiness could be a good thing where IT investments are concerned. Few senior executives understand why their investments in IT have gone wrong or how to get them right in the future, according to recent interviews.*

One reason for their bewilderment may be that it's difficult to calculate the absolute value of information technology to an organization. IT is simply too integrated into most businesses to be isolatable as a variable. And rare is the senior executive who possesses the knowledge and experience to make IT decisions confidently. Many end up delegating fundamental decisions about their business to IT and financial staff. All too often, the result is complex

* Industry interviews by Microsoft and McKinsey.

*Jed Dempsey* is a consultant and *Bob Dvorak* and *Bill Meehan* are directors in McKinsey's San Francisco office; *Endre Holen* is a principal in the Pacific Northwest office; and *David Mark* is a principal in the Silicon Valley office. 

legacy systems, proliferating distributed technologies, and lax development discipline.*

We believe IT decisions must be made like other business decisions: on the basis of value. This means that the "softer," more qualitative benefits that IT can bring must be evaluated and properly factored in. Costs are not the whole story, even when they are projected over the entire life of an investment. Rather, managers need to understand the total value of ownership that an IT investment may represent.

Such an understanding can be developed through a traditional cost/benefit methodology that is customized to address the issues unique to IT decisions. Another prerequisite is the active participation of line managers. No methodology can compensate for managers who shy away from making decisions. Fortunately, the key issues in IT aren't technical, but managerial. Making good IT decisions is something that all executives can do, provided they use a sound evaluation methodology and take the trouble to develop their business and IT judgment.

## Decision-making challenges

Once, figuring out the cost of an IT investment was easy. The cost of a new application, for instance, was just the extra mainframe and disk capacity required, some developer time, and maybe some software licences. The price tag might be bigger than you would have liked, but at least you knew what it was.

Today, the hardware and software may cost you less, but they are just the beginning. Hard-to-predict support and maintenance costs, business costs associated with making the transition to the new system, and other hidden costs can more than double the initial investment.

Benefits are harder to measure too. Where once you could predict and control the number of data-entry clerk positions you would save by integrating your back-end systems, today your goal might be to gain market share or increase customer loyalty. Payoffs like these are not controllable and depend on other business functions beyond IT.

Today's technology is also much more complex, as simple integrated systems give way to proliferating layers of servers, operating systems, network protocols and routers, database software, middleware, and desktop hardware and software. Not surprisingly, it is getting harder and harder to ascertain the long-term impact of any technology choice. Moreover, the integration

* Brett E. Battles, David Mark, and Christopher Ryan, "An open letter to CEOs: How otherwise good managers spend too much on information technology," *The McKinsey Quarterly,* 1996 Number 3, pp. 116–27.

between business units and between functions means that a change in one system often affects dozens of others, some of them, perhaps, in other organizations. And the accelerating pace of technological change, with product life cycles now a matter of months, is a further barrier to good IT decision making.

## The limitations of current practice

These challenges cast a harsh light on current practice in the evaluation of IT investments. Interviews show that companies do not always demand solid business cases for IT investments, that they have trouble handling decisions based on soft benefits, and that they often lack the maturity of judgment to make decisions where only scant quantitative data exists.

Many companies have responded by falling back on a "total cost of ownership" (TCO) approach. This methodology was designed to identify and measure components of IT expense beyond the initial cost of implementation. While TCO can be a useful tool to reduce ongoing costs by improving IT management practices, it is not a sound basis for decision making. Not only do TCO analyses often leave out important cost categories such as complexity costs, they ignore benefits altogether. They also neglect soft and strategic factors, lack a well-defined base for comparison, and have difficulty evaluating lifecycle costs.

Applying TCO blindly can lead to bad decisions such as replacing all PCs with cheaper dumb terminals (because TCO focuses only on cost), or switching vendors every month to get the lowest PC prices (because TCO doesn't capture the cost of supporting multiple vendors or the benefit of volume purchasing agreements).

No methodology can compensate for managers who shy away from making decisions

As an illustration of IT decision making gone awry, imagine Apparel Co., a clothing retailer that is contemplating a major investment to replace its aging network with a higher-capacity backbone to link its stores. Apparel's network operations manager believes the investment is vital because the current network is running out of capacity and because the company's business unit managers will soon want a whole set of new applications. But he can't make the numbers work.

No matter how optimistic are his predictions of maintenance savings, they can't pay for the investment. "There's no way I can make a case for this," he thinks. "The finance guys want only positive NPV projects, and the business guys aren't even involved." He sighs, knowing that Apparel should be investing now to cut operating costs and speed future development. "I'll have

to wait until next year, when the business guys are sure to have big application projects that need the new network. They'll yell at me when I tell them they'll have to wait for a year while the network is upgraded, but I'll be able to use their projects to justify the investment."

Apparel isn't so different from real-life companies that get into trouble when cost is used as the sole or primary criterion in IT decision making. Few executives would consider making non-technical decisions purely on the basis of cost. Yet IT decisions are frequently made with an imperfect or incomplete understanding of the value an investment will bring.

## Total value of ownership

Whether an investment is for a new manufacturing plant, a new regional sales office, or a new application to support a core business process, cost is part of the equation. But the real question is always, "Is it *worth* it?" IT decisions may be harder to make because measurement is difficult, complexity is rife, and technology is constantly changing, yet the essence is the same.

To determine whether an IT investment is worth while, companies must look at its total value of ownership (TVO), which has three ingredients: a sound **cost/benefit methodology** to evaluate the incremental value created by IT investments; robust **management processes** that integrate IT into normal business planning; and the **maturity of business judgment** to make difficult tradeoffs effectively.

### *Cost/benefit methodology*

A robust cost/benefit analysis takes into account the particular issues that distinguish IT investment decisions. The analysis comprises three key elements:

- **Cost/benefit categories** are a comprehensive set of mutually exclusive categories covering the one-off IT and business costs involved in the decision, the ongoing IT and business costs that will be incurred, and the incremental business revenue generated as a result of the investment.

- **Impact categories** classify each cost or benefit according to its quantifiability and predictability. **Hard impacts,** such as the cost of new hardware or the savings in personnel costs after a process has been automated, are controllable and easily quantified. **Soft impacts,** such as market share or productivity gains, are less certain and depend on uncontrollable factors such as consumer response, but can and should be quantified through simple analysis. **Unquantifiable impacts,** such as improved competitive position or increased customer satisfaction, are uncertain and difficult to quantify, but must be described and debated if companies are to reach the right decision.

◆ The **evaluation approach** defines how the outcome of an investment will be measured. It takes into account the time frame over which the investment will be judged, the business and systems areas within which its effect will be measured, the financial method that will be used to evaluate the results, and the base case against which the results will be compared.

So far, so easy? Perhaps not. Despite the conceptual simplicity of the cost/benefit analysis, our interviews reveal that most companies don't apply it effectively or consistently to IT decisions. They regularly overlook basic but important factors that are crucial to a robust analysis.

Taking account of these factors calls for real care. The first step is to scrutinize the cost/benefit categories to make sure that *all* relevant items are included. The categories that are often missed in IT decisions are:

**Transition costs,** or the one-time costs occasioned by the move to the new system (other than the initial hardware, software, and integration investments). They may be incurred if business is interrupted or stopgap IT solutions are required. If a company is planning a new order entry system, for instance, it needs to include the cost of retraining staff in its investment analysis.

**Complexity costs,** which are among the most important and most frequently neglected costs associated with IT investments. They include the ongoing increases in operating costs that arise when a company supports multiple technologies or standards. Investing in a new database technology, for instance, means that an IT organization must acquire a new set of skills, create a mechanism to support the day-to-day operation of the technology, and maintain both skill set and mechanism throughout the life of the technology.

IT decisions are frequently made with an imperfect or incomplete understanding of the value an investment will bring

One way to identify complexity costs is to require projects using non-standard technologies to account explicitly for the additional training, staffing, maintenance, upgrades, replacement inventory, and other costs that will be involved. Another approach is to outsource the operation of non-standard technologies so that all incremental costs are itemized in the service agreement.

**Technical risk,** or what might happen if the project is delayed or key functionality is not delivered. How likely is it that things will go wrong? How big would the impact be? What contingency plan is in place?

One way to estimate the impact of technical risk is to define a few discrete scenarios around, say, the launch date for a given system. The project sponsor

can then estimate the probability of each scenario, and use the result in calculating its financial impact. The gap between the base-case financials for the project and the blended financials of the different scenarios is the "cost" of technical risk.

While such an elaborate analysis is appropriate for major investments with high uncertainty, a simpler version with only one alternative scenario to the base case may be perfectly adequate for smaller investments.

**Future flexibility value.** Another crucial factor in IT decisions is the impact of an investment on the responsiveness of a company's systems. Adding a technology to the portfolio may solve today's problem, but hamper future development. Conversely, an investment in a robust, simple infrastructure may have modest immediate benefits, but a dramatic effect on the speed of systems development and deployment in the longer term. Investing in, say, a new corporate network with standard protocols and spare bandwidth may yield limited cost savings today, yet pay for itself many times over by doing away with the need for piecemeal network upgrades in future projects.

Before you can put a value on flexibility, you must have a vision of the functionality your company is likely to add. If a salesforce effectiveness application is in the cards, then today's investment in messaging infrastructure should get "credit" for any savings it enables in the cost of that future project, and for any business benefit that will accrue when the project is deployed more swiftly. Conversely, a project that increases complexity should be burdened by the rise in development cost and decline in development speed it is likely to impose on future projects.

**Commercial factors.** When choosing a technology or a vendor, it is vital to consider whether that technology or that vendor will be around for the entire life of the system. Will it capture enough of the market to ensure that ancillary products and services remain available? Can it deliver the consistency and quality the application requires? Many companies have invested in "best in class" technology only to be left marooned when the vendor foundered or lost a battle for standards.

Commercial factors can be quantified in the same way as technical risk: by defining scenarios and probabilities. In choosing a technology standard, for example, the base case is that the technology succeeds in the market; the alternative scenario is that it loses the standards battle. Quantifying the alternative scenario involves calculating the cost of converting to the successful standard.

Once a company has identified all relevant costs and benefits, the next step in the analysis is to evaluate their impacts. Hard impacts are easily quantified. To

give the process teeth, they should be put into the budget. Soft impacts should also be quantified, at least roughly, to see whether they are big or small and to understand what drives them. If they are essential to the justification of an investment, they should also be put into the budget.

Many supposedly unquantifiable impacts such as market share gains or improved customer retention are not really unquantifiable at all, and should be estimated. In cases of genuinely unquantifiable impacts, a company should try to predict what broad effect they might have on key drivers of strategic value such as customer satisfaction or salesforce productivity.

The third step in the analysis is to ensure that the evaluation approach employs an appropriate base case and time frame. Any assessment of value prompts the question "Relative to what?" For IT decisions, the answer is "Relative to the status quo." In practice, this means evaluating the cost of standing still by establishing a base case against which to compare alternatives. The base case is particularly critical in infrastructure decisions, since these are often made to avoid steady increases in maintenance costs or the disruption caused by overloaded networks or outdated systems.

Before you can put a value on flexibility, you must have a vision of the functionality your company is likely to add

When evaluating an investment, companies should ensure they extend their net present value analysis over the real life of the asset. An application that will be a core element of the business for decades should not be evaluated by means of a five-year NPV. Neither should a desktop vendor selection that can be changed next year.

### *Applying the methodology*

Although they can both use the same general cost/benefit methodology, application and infrastructure decisions are different in nature. Application decisions are based on the business benefits expected from the investment. Payoffs tend to be uncertain, and soft and unquantifiable benefits may dominate the analysis. By contrast, infrastructure decisions tend to be large and lumpy; as contributions to the foundation that supports the entire portfolio of business applications, they produce benefits indirectly.

The best way to treat application decisions is to categorize them in terms of value and risk. Application investments with very high value and low risk might be described as "home runs," and do not require detailed cost/benefit analysis. All that is necessary is to add up the costs and benefits and ensure that the latter substantially outweigh the former. Similarly, investments with low value and high risk are "strike-outs" that companies should not waste valuable resources in evaluating.

The difficult cases are those where risk and value are more evenly matched. High-value, high-risk investments call for a careful analysis both of risks and of soft and unquantifiable benefits. Such investments should be treated as R&D, and be divided if possible into small-scale pilots to reduce uncertainty before too many costs are incurred. Low-value, low-risk projects, "singles" in our parlance, are the bread and butter of many IT departments, but threaten to soak up management and developer time. The best IT organizations are able to focus their efforts on home runs and avoid a proliferation of singles.

There are three main types of infrastructure decision, each with issues of its own. For **capacity additions,** the key elements of the analysis are establishing a robust base case and estimating the value of the flexibility that the increased capacity will bring. For **technology upgrades,** the challenges lie in identifying all transition costs, assessing the value of greater flexibility, evaluating technical risks, and selecting an appropriate time frame for the analysis. When **adding new capability,** companies must take special care in setting the scope of the decision (how much of the infrastructure and application costs and benefits are to be included), incorporating complexity costs, evaluating technical risks, and assessing the commercial viability of the technology or vendor.

### *Management processes*

Although a sound cost/benefit methodology is necessary if companies are to make good IT investment decisions, it is not sufficient. What is also required is a set of management processes that connect IT decision making with its business context and get the right people involved at the right time.

The first step is to integrate IT projects into the normal business planning process. This process typically kicks off with an overall corporate strategic plan for the coming year, which the business units then use as a basis in developing their own strategic and operating plans. In turn, these plans are finally rolled up into an overall corporate operating plan.

The integration of IT planning into this process starts with the linkage of business and IT strategies at the corporate level (*see* exhibit). In the best companies, the two are tightly intertwined, and there is a clear idea of the core processes and sources of competitive advantage and of how IT will support them. This translates into a long-term vision of an IT infrastructure and architecture that will serve the goals of the business.

Integration also means that IT and business unit staff must work together to develop a plan for IT that becomes part of the business unit plan. The IT technical infrastructure should be treated as another business unit, with the chief information officer as its leader. Out of this planning process should

come a prioritized list of IT investments based on business cases that have been developed through the use of the TVO cost/benefit methodology.

The corporate operating plan incorporates cross–business unit and company-wide projects, as well as the plans from the individual business units. At this stage, the final list of IT projects must be balanced against other business investments to establish the right level of funding. Unless the same rigor is applied to IT projects as to other investments, it is impossible to arbitrate between them.

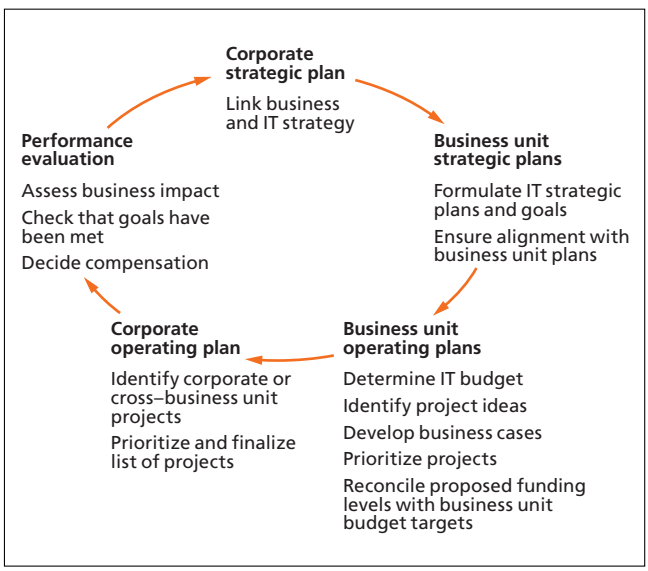
In this process, business management is involved at every stage of project development and evaluation. Among IT investments, only infrastructure projects, for which the CIO is the business owner, are originated, developed, and championed by the IT organization. As a result, business managers are fully on the hook for developing business cases and selecting projects. If a project doesn't deliver, the responsibility lies with the business manager, not just the IT staff.

### *Maturity of judgment*

Many business decisions cannot be made "by the numbers." For big decisions, such as entry into a new market or investment in a new technology, it may be that no amount of analysis can remove the uncertainty. For small decisions, analyzing to the *n*th degree is simply a waste of management time. Analysis can undoubtedly reduce uncertainty and help quantify it, but in the end there will be many decisions where unquantifiable factors are critical. In such cases, senior managers have to fall back on their business judgment.

The trouble is, most business managers have only limited experience of IT. For years, IT was a back-office function that attracted little management attention, and definitely didn't rank as a stop on the road to the top. Today's CEO may have started by working in finance, or marketing, or manufacturing, but almost certainly not by developing or operating information systems. For this reason, most executives lack the maturity of IT and business judgment they need to make decisions driven by soft benefits.

**Integration of IT and business planning**



Unfortunately, there are no shortcuts to building judgment. It takes time and experience. The answer is to get started now, or risk damaging the business through poor IT decisions. Two steps will help:

**Involve key people.** The CEO must facilitate IT decision making or empower the CIO to do so. Without a strong message from the senior business manager that understanding and "owning" IT investments is high on his or her agenda, other business leaders are unlikely to spend the necessary time driving IT decisions.

**Leverage the management process.** Use the planning process as a forum for building experience, and develop judgment by applying it rigorously. Go deep rather than broad; start by picking a few decisions and doing them well. Ensure that you are making good decisions; take care not to damage the credibility of the process by executing it mechanically.

By following these guidelines, senior managers can gradually develop a feel for IT that is just as important as employing the right processes and the right analytical tools. The most important IT decisions often come down to judgment. Consider this testimony from a consumer goods CIO: "The investment in systems to get store-level data in the hands of the salesforce was a negative NPV project. Knowing it had huge intangible benefits, we went ahead, and it provided us with a tremendous competitive advantage."

## Putting it all together

Let's return to the network investment at Apparel Co. to see how TVO might resolve the problem. The IS steering committee is meeting to consider the proposal, whose NPV is millions of dollars in the red. "Have you projected what will happen if we *don't* make this investment?" asks the CIO. "All the new demands we're putting on the old network are pushing up our maintenance and business interruption costs, which are going to skyrocket if we do nothing. We have to judge cost savings against the right base." "And what about the flexibility this new network will give us in developing new functionality?" says the general manager of Duds "R" Us, the largest business unit. "That's a big benefit that I don't see captured here."

After factoring in the escalating costs of the current network, the network operations manager returns to the IS steering committee. "Using the new base case makes the project essentially zero NPV," he says. "That doesn't include flexibility value, which we didn't quantify because our future development plans are uncertain."

"What do you think, ladies and gentlemen?" asks the CIO. "I think we have to do it," says Duds' general manager. "The project looks breakeven, but it has

big flexibility benefits that my business could really take advantage of. It reminds me of the data architecture project three years ago. That looked negative as well, but it has sure paid dividends by enabling store-by-store assortment." "I agree," says another business unit general manager. "We'll just have to knock some things off the bottom of our list to pay for it."

Apparel Co. made the right decision by applying TVO. It did the right analysis, correcting the base case to include the cost of doing nothing. It had the right people in the room, first to probe the analysis and then to apply business judgment. And after years of business involvement in IT, they had sufficient maturity of judgment to make tradeoffs based on unquantifiable factors.

Once a cost center, IT is now at the core of many businesses. It can be a source of competitive advantage if managed well, a liability if managed badly. Cost-focused approaches to investment decisions will miss huge business opportunities; if misapplied, they can even lead to escalation in costs over time. IT decisions must instead be made on the basis of value, using a sound cost/benefit methodology, robust management processes, and mature IT and business judgment. That means that business managers must take ownership of IT investments and get fully involved in the decision-making process.