SAP White Paper
Business Intelligence

MANAGING THE TOTAL COST OF OWNERSHIP OF BUSINESS INTELLIGENCE

A 360-DEGREE PERSPECTIVE

CONTENT

About the Author

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EXECUTIVE SUMMARY

IF YOU DON'T MEET YOUR NEEDS, COST DOESN'T MATTER

A major question that companies are asking business intelligence (BI) providers is, "What is your total cost of ownership?"

For many companies, total cost of ownership (TCO) is out of control. And the problem is growing, fueled by ever-increasing demands from the user community, massive new sources for data, new capabilities, shadow IT landscapes, and the cost of keeping people abreast of all the changes.

User expectations are growing. BI users expect all information to be available all the time and in a format that can be easily understood and easily accessed. In addition, the data must be of high quality, transparent, and relevant to their jobs.

These demands are not that unreasonable considering the culture we live in today, with information coming at us from the time we wake in the morning to until the end of the day.

How does an organization position itself to deliver a cost-effective BI solution that can meet its user community's thirst for information and offer the lowest TCO? How does it manage the TCO of BI? For IT professionals, this is a problem that keeps us awake at night.

The purpose of this paper is to focus on developing a framework for monitoring and managing the TCO of BI.

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WHAT IS MY BUSINESS INTELLIGENCE TOTAL COST OF OWNERSHIP?

ANSWERING THE RIGHT QUESTION

A number of metrics have been proposed for determining total cost of ownership of business intelligence, such as cost per user and cost per report. While calculating the TCO of BI – or for that matter any IT solution – may be interesting, the real issue is more about the management of TCO. To manage BI TCO, just like managing any organizational expenditure, we have to look at business need.

Business Need Drives IT Spend

The TCO of BI is tightly coupled to business need. It is business need that drives IT spend in this area. In general, the maturity of a company's BI capabilities has a large impact on TCO. Business intelligence tools are scalable with respect to capacity, so the cost as load or users increase is fairly proportional. Once a BI effort reaches critical mass in a company, the increase in cost per headcount, per query, or per report remains relatively constant. Therefore, a key driver for managing the total cost of business intelligence is a company's ability to effectively incorporate business need into a flexible yet sustainable solution. This is not to say we are advocating limiting business need to control costs, but we advocate that the cost of business intelligence, like any other part of business operations, be controlled by assessing and understanding the business need and letting that drive the priority of spend.

Business need changes and shifts over time and so does the need for BI within an enterprise. New needs arise, while others disappear as does the need for certain types of data. One of the quickest ways to decrease the cost of BI within an enterprise is to thoroughly examine each area and determine what portions of it are no longer required to support business needs. These could include obsolete reports, tools, and data. In some cases, there may even be the opportunity to simplify solution sets, standardize the data model, and rethink the user community delivery model.

For example, if a data warehouse is five years old, and if we assume that most reports are run only over this year's and last year's data, then only 40% of the data in the data warehouse may actually be required within the production system. Some of the data, like that used in reports on shipped items or closed sales orders, might have a shorter useful life. By examining the useful life of the data, we can take actions, such as archiving data, that can increase system performance significantly while saving hundreds of gigabytes of storage at the data warehouse level, to say nothing of the backups, change logs, and duplicate copies.

Another example is the use of the right tool for the right job. Most business intelligence enterprises put the burden of developing analytics on the IT department or power users within the business units. A tool that uses in-memory analytics and an intuitive interface lets users explore and analyze large data sets and save the view for future reference. This could eliminate the need for hundreds of reports to be generated.

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HOW SHOULD ENTERPRISE BUSINESS INTELLIGENCE RUN?

MANAGING TCO FOR BI REQUIRES A SYSTEMIC VIEW

In an ideal world, we would have a structure for enterprise business intelligence that is similar to the structure in Figure 1.

Enterprise business intelligence is framed by business processes and business decisions, which dictate the requirements for information technology. Information flows from transaction systems and other data sources to the target data store under the guidance of extraction, transformation, and loading (ETL) activities; governance; and documented data processes. The focus is on providing quality data and a single version of the truth. This data store feeds carefully constructed measurement frameworks and analytics, which are then combined to provide accurate, business-relevant information that helps support business decisions.

A spreadsheet culture has evolved over time to bridge the gap between the business need and what BI provides. The result is an increase in the actual TCO of BI that is rarely measured.

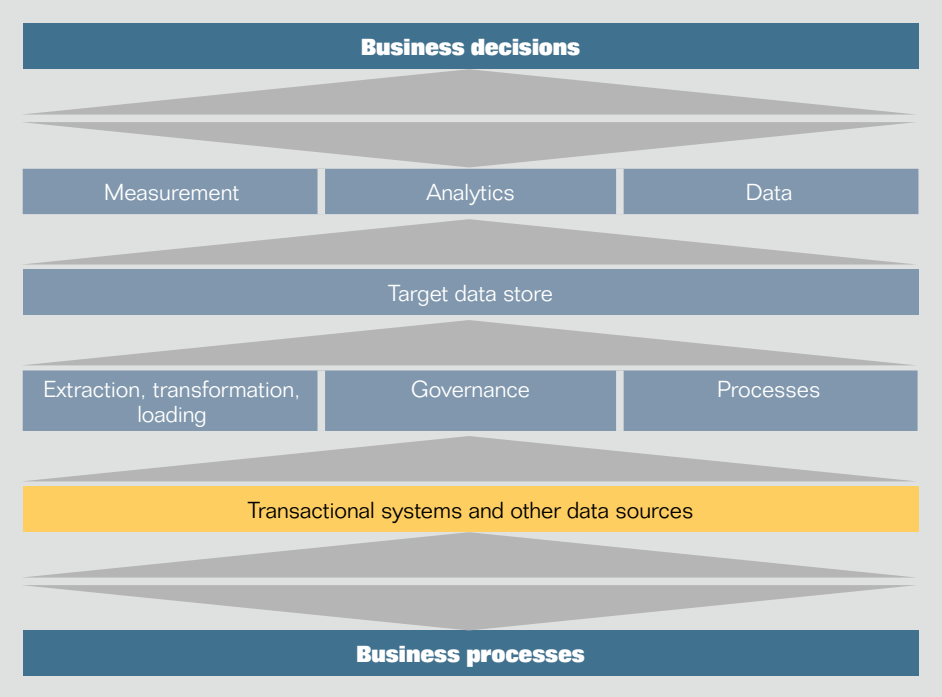

Figure 1: The Structure of Enterprise Business Intelligence

Unfortunately, BI has historically started as a departmental effort. In this case, there was an over-emphasis on achieving quick wins but little emphasis on how to organize the efforts to form a single structure. This has resulted in enterprise BI structures more similar to Figure 2.

When viewed from the enterprise level, the business intelligence structure appears as a series of disjointed overlapping silos. Often different software tools support this type of BI structure. This is neither a simple nor a sustainable landscape. This type of structure leads to multiple versions of the truth, requiring reconciliation of reports and duplicate data sets. The cost of maintaining this kind of structure is higher than necessary. To make matters worse, as more business needs arise and are met, complexity and duplication continue to grow.

Even if we normalize this landscape, a deeper problem may not be solved as easily. BI often is used to provide information that feeds a spreadsheet. Spreadsheet-driven processes have a high cost, inhibit information sharing, are subject to higher error rates, and often require a substantial amount of staff time to maintain. A spreadsheet culture has evolved over time to bridge the gap between the business need and what BI provides. The result is an increase in the actual TCO of BI that is rarely measured.

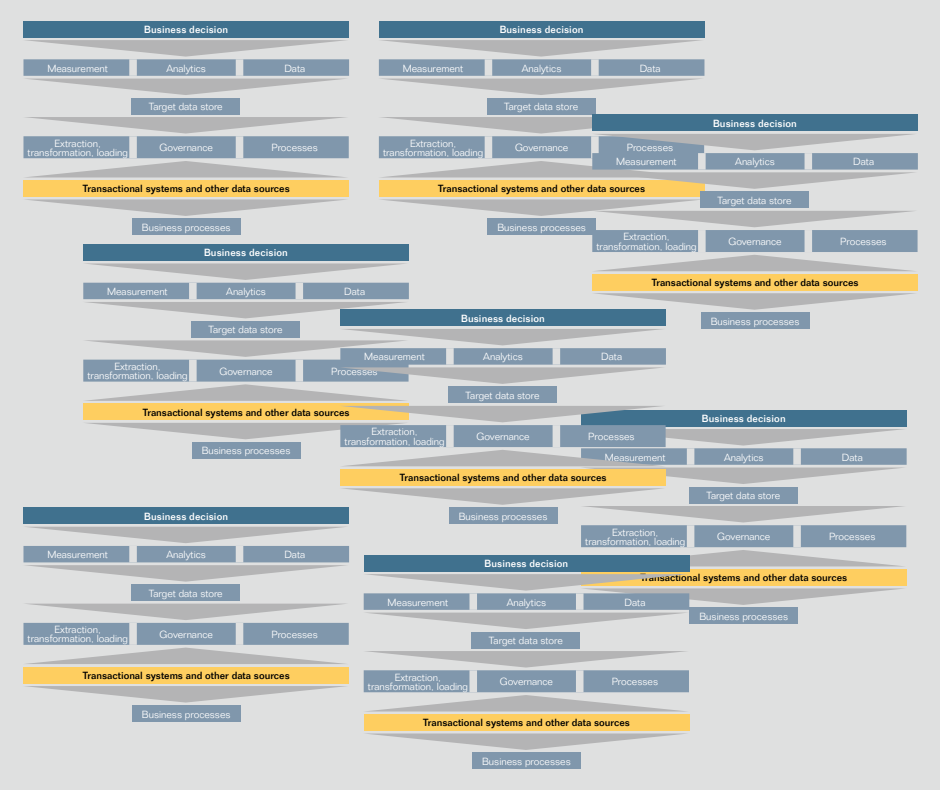

Figure 2: Typical Business Intelligence Structure

DATA EXPLOSION AND STRATEGIC INFORMATION MANAGEMENT

TAKING ADVANTAGE OF DATA TO BECOME AN ANALYTIC COMPETITOR

Creating additional urgency to managing TCO is the increased burden created by the data explosion depicted in Figure 3.

The digital universe (defined as all content stored in digital form) will expand by a factor of 44 between 2009 and 2020.[1] This growth creates both an opportunity and a challenge. The opportunity is to glean value out of this data and improve business processes. The challenge is that this explosion taxes current business intelligence practices

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by creating more demand for already scarce resources. With this greater demand comes increased cost. The alternative, not leveraging this newly available data, leaves an organization at risk of losing a competitive advantage.

Not long ago, data was scarce. Data was coveted because it was difficult to obtain and difficult to capture in digital form, and tools for analysis were in the hands of a few experts. While the circumstances have changed drastically, the sociology of data has not. We still hoard data, and we still rely on experts, whether IT or power users, to convert data to information. This creates IT cost as well as multilayered and siloed structures, increasing the cost of BI and preventing organizations from realizing their true potential.

Figure 3: The Data Explosion

1. IDC white paper sponsored by EMC, *The Digital Universe Decade – Are You Ready?*, May 2010. The most recent version of the study can be found at www.emc.com/collateral/demos/microsites/idc-digital-universe/iview.htm.

Capitalizing on the Data Explosion with Top-Down Development

Understanding business needs is critical to the entire process. But how should business needs be constructed and normalized? Many BI efforts start with and perpetuate a bottom-up approach. A bottom-up approach has the adverse effect of creating disjointed, overlapping siloed structures and multiple data sets. It fails to capitalize on the cross-functional use of data. This results in duplicated efforts to collect, store, and analyze data while increasing TCO.

Implementing a top-down approach may be easier for an organization just embarking on its BI processes than for an organization that has a substantial embedded base. For example, consider a company that has over 20 installations of different BI tools. There are multiple definitions of items such as revenue and income. There are also multiple data stores that support thousands of reports. In short, without appropriate coordination the company's BI efforts evolved into a very expensive and inefficient system.

One of the success factors critical to managing BI TCO is establishing a BI center of excellence (CoE) to provide a top-down focus. This requires committed senior executive sponsorship, especially in a mature BI organization. In an organization with multiple data definitions, data stores, and tools, senior leadership is necessary to resolve differences and prevent a stalemate between different constituencies.

> Simplifying the tools in the IT landscape is a powerful cost driver, not only in license and maintenance costs but in training, usability, and staffing. It avoids the expense of training people on different analysis tools when they change organizations.

One of the first activities of a CoE is conducting an inventory of what exists in the BI landscape for the entire company. Focusing on and understanding the cost drivers, described in a following section, provides a solid framework for conducting such an inventory.

Another activity is understanding and aligning the inventoried items to the business. How does the entire BI infrastructure compare to best-practice principles? While this is a time-consuming process, it is necessary if the organization is going to normalize practices and streamline costs. For cross-functional areas, large savings can be made by leveraging information and analysis, eliminating the need for the duplication of data stores, metadata, and analytics.

CONTROLLING THE COST OF BUSINESS INTELLIGENCE

OPTIMIZED DATA MODEL AND APPROPRIATE ANALYTICAL TOOLS

One of the keys to controlling the cost of BI involves examining the data architecture to determine what is necessary and what is not. Tracing how many times a piece of information is duplicated and stored is a powerful method to understand the complexity of the data model and provides the opportunity to optimize the model without destroying the ability to provide effective information to users.

Another area of focus is understanding data's intrinsic value in answering business questions. Not all data has the same value, and a thoughtful business understanding allows organizations to effectively prioritize their burgeoning list of requests for information.

Providing Appropriate Analytical Tools

A typical complaint about using data analysis to solve business problems is that by the time the data is collected, cleaned, and analyzed, the deadline for making the decision has passed. This issue can be overcome by creating an analytical architecture that is responsive to business needs and is driven by business value. Part of being responsive to business needs may be accomplished quickly by providing the appropriate analytical tools to the right people. This can trigger a process of discovery that is highly relevant to bridging the gap between IT and the rest of the business.

Dashboards have gained great popularity over the last few years. They are a powerful tool that allows an individual to easily explore a limited information domain. Dashboards are particularly useful when you have a good handle on the guided analysis that the user requires. Guided analysis relies on anticipating users' questions and providing them with an easy way of accessing the information, whether through the use of drill-down techniques, dynamic links, or parameterized reports.

Creating a dashboard assumes you have enough knowledge of the analytical process to anticipate the next question. Sometimes the questions are not easily anticipated, or the number of possible views is extremely large. In these cases, different tools, such as in-memory analytics, might provide the user with the ability to explore data more freely and easily.

Additionally, you need to be careful not to confuse understanding of tools with understanding of data. Both are necessary. It can take users longer to understand the definitions of data they are analyzing than to learn about the tools that they use to analyze it. Training people on both the data and analytics tools is necessary. It's not just about the availability of data; it's about understanding business relevancy as well.

Gaining a competitive advantage in today's accelerated data explosion is a huge opportunity. Companies must efficiently manage the influx of data while also controlling costs. This requires taking a holistic view of bringing data and an analytic architecture together with business needs and training. In this way you can manage and reduce the TCO of BI while still fulfilling increasingly complex business needs. There is even a possibility of being able to reduce TCO while expanding functionality.

UNDERSTANDING THE COST DRIVERS OF BUSINESS INTELLIGENCE

A COMPLETE VIEW OF THE BI COST STRUCTURE

Figure 4 provides an overview of the cost drivers for business intelligence.

Each of the cost drivers in Figure 4 provides a different view of the BI cost structure. While each of these views has a different focus, it is important to keep in mind that they are interdependent and must be balanced. Policies and efforts in one area affect how things work in another. Business needs permeate all of the areas.

Business Needs

A key function of a BI center of excellence is the alignment of projects to business needs. There are a number of ways to structure a BI CoE to coordinate and prioritize business needs. At one extreme, the CoE acts as the coordinator of all BI projects. This type of organization has a mandate that nothing happens without the CoE's seal of approval. At the other extreme is a CoE that seeks only to foster awareness. This type of CoE acts more like an information exchange rather than like a governing body. It provides transparency into and accessibility of the BI activities of different groups so that efforts can be leveraged throughout the company. Different combinations of these structures should be examined against the backdrop of your own organizational and change management culture to effectively control the business-need element of the cost framework.

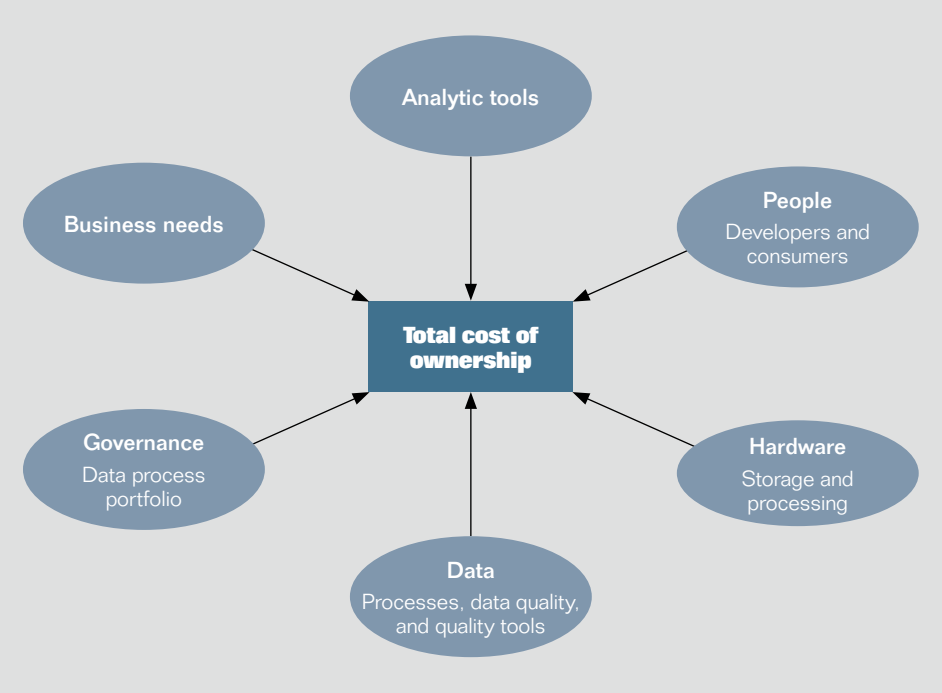

Figure 4: The Cost Drivers of Business Intelligence

Analytics Tools

Managing the strategy for using analytics tools is also critical to controlling cost. As a rule, an organization should strive to maintain the minimum number of tools that will satisfy business needs. Simplifying the tools in the IT landscape is a powerful cost driver, not only in license and maintenance costs but in training, usability, and staffing. It avoids having to train people on different analysis tools when they change organizations. It also provides for a large core of people who understand the tools and are available to mentor newcomers. The key is to understand and match tools and techniques with business needs. What are the consequences of eliminating or adding a tool? Does the current tool set allow for the flexibility and hands-on analysis demanded by today's users?

People

People costs fall into two categories: developers of BI reports and analytics and consumers of information. In some cases, developers and users are the same people, but in many cases they are not.

According to a survey conducted by SAP and the Americas' SAP Users' Group of more than 230 companies, users of BI and reports outnumber developers of reports by 5 to 1 (per 1000 employees in a company):[2]

- Percentage of people that create BI reports: 6%
- Percentage of people that consume the information in BI reports: 29%

This finding raises the following questions. Is this ratio too high or is it not high enough? What should be the correct target for the ratio of creators to consumers of BI reports and analytics? The answer to these questions depends upon the nature of the analytics that are being performed, the extent of user self-services that are involved, and how effective the work products are in delivering analytics. One way to measure effectiveness is how well the work products match users' needs in terms of providing users with the necessary information to take action.

If the work product is complete, a user should be able to obtain the information without any additional processing of the data. However, in many cases, it is necessary to employ an additional tool such as Microsoft Excel. This leads to questions about the effectiveness of the work product itself, since the end user must perform additional steps or use a second product. The calculation of BI TCO should take into account this additional work time.

Hardware

The cost of hardware includes storage, processing, and networking. While hardware cost has decreased per unit, the amount of hardware required keeps increasing. Many companies find themselves buying additional hardware on a quarterly or semiannual basis to keep up with data growth. While some of this added hardware is leveraged to the organization's bottom line, there is no doubt some waste. Storing unneeded data in production systems, running and maintaining analytics that are not used, and maintaining underutilized data sources add to the cost.

As the investment in hardware grows, the cost to execute on BI projects also grows because of additional hardware and an increasingly complex environment. By taking a more thoughtful approach to data rationalization and near-line storage options, you can free up system resources to increase performance and give more focus to data and information quality.

Data

For the purpose of this paper, we define the cost of data as the cost of the processes it takes to manage data and make it available in a usable form. This includes the cost of the tools, processes, and people that go into creating a data warehouse and into developing and maintaining tools for ETL and data quality.

Governance

Governance completes the circle. These are the rules of operation for enterprise business intelligence. They are very much a part of the BI center of excellence and align with an organization's business needs.

2. The BI survey was launched in January 2007 and continues to be actively administered through the ASUG and SAP benchmarking program Web sites. Respondents to this survey are from many different industries and geographies and range from small businesses to large enterprises.

BEST PRACTICES FOR MANAGING TCO

LEARNING FROM INDUSTRY LEADERS

In 2005 a study conducted by SAP in collaboration with ASUG studied best practices for managing TCO.[3] It included 30 companies with incomes ranging from US$100 million to more than $100 billion and the number of employees ranging from 400 to 150,000. The companies represented a variety of industries. While this study looked at TCO in general, its conclusions appear to apply to TCO for BI. Although the study was conducted almost five years ago, these findings are still extremely relevant today.

The study cites four primary best practices that industry leaders in TCO have in common:

- To achieve the optimal balance between IT cost and business benefit, focus on the business impact of every IT solution and ensure that C-level decision makers understand the issues that arise throughout the entire lifecycle.
- To manage critical processes and limit dependency on external resources after an IT initiative, make it a priority to leverage, build, and retain in-house talent.
- To minimize TCO, develop centers of excellence (shared services operations).
- Simplify the business intelligence landscape and standardize on common tools.

The study states that business alignment is critical to success. It becomes even more important when companies have either geographically or legally disparate entities. In these cases a strong centralized governance structure is a critical factor to manage TCO.

The balance between IT cost and business benefit means continually involving the business in determining the portfolio of projects. This allows IT to better allocate scarce resources. Care must be taken on setting standards for the definition of business value to prevent interdepartmental arguments over resources.

The study points out the importance of maintaining an internal core of people and limiting the dependency on external resources after the initial initiative. The key here is to avoid expensive external resources to do continuing jobs beyond the initial bubble. It also points out the importance of maintaining and retaining a group of well-trained individuals.

We have already spoken about the importance of establishing a center of excellence. The study concludes that companies with a center of excellence had a 47% lower TCO per active employee than companies that lacked one.

Lastly, simplifying the landscape creates benefits at all levels in the organization. These are summarized in the table below, which shows that benefits of landscape simplification are present in many areas across the C-level.

Principal Benefit	**Process Standardization**	**Increased Efficiency**	**Faster Growth**	**Risk Reduction**	**IT Portfolio Simplification**
Key Driver	EVP or CEO	CFO	CEO	CFO	CIO
Benefits	▪ Global design, local flexibility ▪ Acquired back-office operations ▪ Replication of business practices	▪ Optimal cost structure ▪ Collaboration ▪ Speed of acquisition	▪ Global and timely visibility ▪ Acceleration of change initiatives ▪ Ability to take advantage of opportunities	▪ No disruption of production and delivery ▪ Compliance with Sarbanes-Oxley Act ▪ International compliance	▪ Simpler IT architecture ▪ More responsive IT ▪ More funds for innovation ▪ Reduction of IT cost base

3. Hercules Bothma, *Best Practices in Managing the Total Cost of Ownership*, ASUG and SAP, June 2005.

SUMMARY

ROAD MAP FOR CONTINUAL TCO IMPROVEMENT

The key to managing TCO is interdependently managing its six drivers:

- Business needs
- Analytics
- People
- Hardware
- Tools
- Governance

For companies that have a mature embedded base of business intelligence, managing TCO requires a careful examination of how they stand in relation to managing these six factors. The gaps between the current state and best practices can be assessed. A road map of continual TCO improvement can be put in place to migrate the organization to an efficient and effective environment.

For More Information

To learn more about the software and tools that can help you manage TCO for BI while enhancing the availability and quality of enterprise BI for better-informed decision making, please contact your SAP Services representative today or go to www.sap.com/usa/services/consulting/bts.

To achieve the optimal balance between IT cost and business benefit, focus on the business impact of every IT solution and ensure that C-level decision makers understand the issues that arise throughout the entire lifecycle.

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