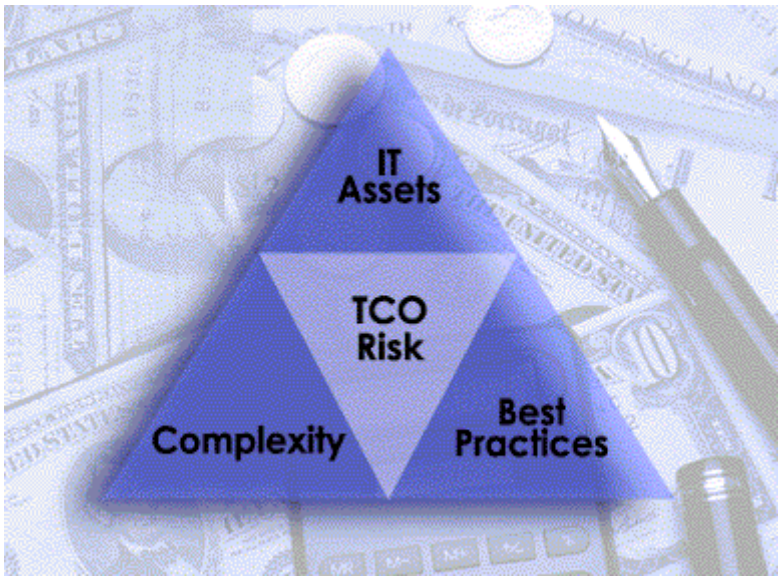
TCO Analyst

A White Paper on GartnerGroup's
Next Generation Total Cost of Ownership Methodology



Prepared on Behalf of
Sponsors of a Multiclient Study on Total Cost of Ownership:

AST Computer
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Cirrus Logic
Citrix
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NEC
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by:
GartnerConsulting
Stamford, CT

Management Summary

Total Cost of Ownership (TCO) has become an important metric for the information technology (IT) industry. As the leading research and advisory firm on this topic, GartnerGroup is entering the next phase in its quest to extend the TCO concepts for managers and suppliers of IT. We are expanding the scope of our current TCO methodology and encapsulating our expertise into a new TCO model (currently in prototype form) that provides a more comprehensive analysis of distributed computing costs.

The enhanced TCO methodology includes a broader list of technology platforms than is currently addressed. The methodology is designed with a consistent architecture and chart of accounts to permit both high-level and fine-grained analysis. In addition, the effect of best practices is evaluated from both a base technology and implementation perspective.

The design also includes several new dimensions to which GartnerGroup has already devoted years of research: complexity and worker type. We have found that a more complex IT environment typically leads to a higher TCO and we hope to help enterprises lower computing costs by reducing complexity. We also note, however, that some highly complex environments warrant higher costs (for example, a stock trader) than others (a data entry clerk). Therefore, we are adding to the TCO model quantitative information that reflects the nature of the work performed. Many organizations have equipped workers as if they are knowledge workers with sophisticated computing requirements, even if they are not.

Finally, a risk factor is added as a new evaluation metric in addition to cost. We think risk is a critical component in that a pure cost management approach may actually increase risk in the IT infrastructure. For example, backing up data is a pure cost/risk exercise. Without taking risk into account, backup would be an intolerable cost; by considering risk, it becomes a prudent IT process.

The original GartnerGroup TCO model was based on a "typical" loosely managed deployment of 2,500 PCs in a campus setting. We recognize the need to easily customize the model to accommodate the myriad types of installations worldwide, so we have developed a powerful software prototype, the TCO Analyst, as a proof of concept. Its objective is to create a comprehensive TCO profile of a current IT environment and enable extensive "what if" capabilities to explore the impact of new technologies and its implementation against this profile.

We have embarked on this effort with support from many of the most influential suppliers in the IT industry. The common objective is the desire to help enterprises lower computing costs by credibly evaluating more sophisticated technology and labor intensive processes, such as peer support. If best practices are used to intelligently deploy this technology and attack these high cost processes, organizations can reduce cost, risk or both.

Part of our objective in this research effort is to create a comprehensive TCO framework that can be used throughout the IT industry. To achieve consensus, we have made a conscious effort to solicit input from other organizations that have made their own contributions in this area. Key contributors to this project include Intel, IBM, and Interpose, a Florida-based software developer. In addition, we received suggestions from Prudential's IT group, Intel's IT group and CyberConsulting, an IT consultancy. Finally, each of the sponsors listed on the cover page provided valuable commentary and insight.

The TCO multiclient project described herein was managed by GartnerConsulting and reflects the contributions of GartnerMeasurement and GartnerAdvisory. The project has already produced new areas of collaboration and research both within and outside of GartnerGroup. We anticipate that as we continue to move forward new collaborators will help us to refine the work we have set in motion.

More important, we hope that the IT industry will accept the implicit challenge we have created to give IT managers better tools to lower computing costs while maintaining a high level of user functionality. This challenge applies not only to suppliers of base hardware technology, but also to IT vendors that provide key systems management solutions to unlock the power of this technology. It also applies to developers creating next-generation productivity and enterprisewide applications as well as service providers.

So, with great expectation, we describe the TCO Analyst methodology, a client-sponsored extension of the venerable TCO model that GartnerGroup has developed over the past 10 years.

Additional information is available on our Web site at www.gartner.com.

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Section 1

Background and Objectives

For the last 10 years, GartnerGroup has counseled its clients to consider all costs associated with computing when making management decisions about PC acquisitions, upgrades, support and administration. During this time, we have created and evangelized the concept of TCO to the information technology (IT) community. As corporations have begun to address the significant and rising costs devoted to their IT infrastructure, the message has gained wide acceptance among IT users. As technology suppliers seek ways of meaningfully differentiating themselves, they too have turned to the TCO model as a means of underscoring their value to the customer.

While the basic concept of the TCO model is now well accepted, and the simplicity of the original model has been a virtue, the model's current state lacks the ability to distinguish between different computing environments beyond operating systems. In addition, the model provides little in the way of quantitative guidance as to the features or policies that may change an organization's computing costs.

The objective of this research is to create an industry standard TCO methodology that can be implemented and customized via a software tool to quantify new concepts and cost-related detail developed by GartnerGroup in its TCO research. Essential to this undertaking is the simple concept of objectivity that guides all GartnerGroup research. Therefore, the TCO methodology will favor no single IT product, supplier, group of IT suppliers or computing architecture, but will accurately provide enterprises with a credible means of evaluating options to intelligently reduce IT costs.

To prove the concept of an industry-standard TCO methodology, we have created a software prototype, described in this white paper. Specifically, the TCO Analyst highlights how initial improvements to the existing GartnerGroup TCO model are addressed and incorporated into a comprehensive software model and how end-user assumptions could be customized to evaluate each organization's unique requirements. Note that the initial version of the software prototype provides a representation of the application as it may ultimately appear and operate and does not provide calculation or modeling capability. The user is able to navigate dynamically through the application, but data entry does not affect the results.

The initial version of the TCO Analyst prototype is currently under evaluation by GartnerGroup and the sponsors of this project.

Section 2

Product Methodology

2.1 Summary

During the last few months, GartnerGroup conducted a companywide review of its current TCO models (PC, LAN, Storage, etc.) to determine how they might be improved to better support the requirements of IT users. Initial funding was provided by Intel, who was then joined by 11 other sponsors (listed below) in a multiclient study that included GartnerMeasurement and GartnerAdvisory and was coordinated by GartnerConsulting.

The methodology followed for this study is outlined below:

Step 1. Reviewed Current TCO Methodology—Assessed objectives, structure, content and delivery vehicles of current GartnerGroup TCO research.

Step 2. Designed Improved TCO Methodology —Determined which new TCO elements were important to incorporate into architecture; created high-level sketches of interaction of key elements.

Step 3. Sponsor Input—Input from project sponsors was solicited.

Step 4. Designed Software Prototype Flow—Logic and data flows were mapped to a new TCO software model.

Step 5. Created Software Prototype—Working with Interpose, Inc., created an initial prototype of the TCO Analyst as a proof of concept of new methodology.

Step 6. Reviewed Prototype—Sponsors reviewed the “draft” version of the TCO Analyst. Input and suggestions for refinement were solicited.

Step 7. Revisions to Prototype—GartnerGroup used its professional judgment as to which elements of the prototype were revised for the final version.

Step 8. Final Prototype—A final prototype was delivered to study participants just prior to the Comdex announcement.

Step 9. Comdex Announcement—The TCO Analyst methodology and prototype were announced at Comdex by GartnerGroup and project sponsors on November 18, 1997.

Two steps remain in the GartnerConsulting multiclient project:

Step 10. Customer Feedback—A brief survey will be conducted by GartnerConsulting of firms on the usability of the TCO Analyst.

Step 11. Presentation to Sponsors—Survey results will be presented to sponsors.

The research for this report was conducted between July and November 1997.

2.2 Project Sponsors

This white paper and the related TCO Analyst software prototype were sponsored by 12 leading IT suppliers in a multiclient study, sponsored by GartnerConsulting. Sponsors were invited to participate in discussions about the GartnerGroup TCO model as described above and many provided valuable suggestions and insights. All work discussed in this paper and the related TCO software prototype, unless otherwise stated, reflects the views of GartnerGroup and remains the property of GartnerGroup.

Figure 1. GartnerConsulting TCO Multiclient Study Sponsor List

AST Computer	Intel
AT&T	Microsoft
Cirrus Logic	NEC
Citrix	Novell
Compaq	Toshiba
IBM	Wyse

2.3 Interpose, Inc.

Interpose, a leading software developer in the area of TCO, provided valuable assistance in this research effort, particularly in the development of the TCO Analyst software prototype. As discussed in this white paper, GartnerGroup has adopted the terminology used in the Interpose TCO chart of accounts in an effort to provide greater consistency across the GartnerGroup TCO modules. The interface for the TCO Analyst software prototype reflects the work Interpose has done on its own TCO tool, TCO Advisor.

Additional information on Interpose is readily available at www.interpose.com.

Section 3

GartnerGroup TCO Analyst—The Next Generation TCO Methodology

3.1 New GartnerGroup TCO Methodology

Today, GartnerGroup maintains half a dozen TCO models covering technologies including PCs, NCs, mobile computers, LANs, storage and others. While most of these models employ a common architectural design, it has long been apparent that gaps exist in technology coverage, the model's ability to approximate a real—not average—user's cost and the predictive capabilities of the model.

In addition, GartnerMeasurement (formerly Real Decisions) conducts sophisticated benchmarks to help organizations understand IT costs from a real (budget-based), not theoretical (industry-average) perspective. While there is substantial consistency between the GartnerAdvisory TCO models and the GartnerMeasurement consensus models, many users of both are confused by the differences, the natural result of trying to identify and contain IT costs through two different methodologies.

The new GartnerGroup TCO Analyst methodology is designed to address these deficiencies while building on the rich heritage and user acceptance of the current GartnerGroup body of research. There are eight important elements to the new model as described below. While some of these items have been published previously by GartnerGroup, others are new. Equally important is the comprehensive nature in which all items (new and old) are treated in the TCO Analyst in an interactive software prototype that illustrates the new methodology.

Figure 2. TCO Analyst—List of Enhancements to Current TCO Models

1. Modular TCO architecture
2. Consistent chart of accounts
3. Addition of environmental complexity
4. Addition of worker type
5. Addition of best practices
6. Addition of risk as output
7. Compilation of all items into a software tool
8. Inclusion of GartnerGroup research into a software tool

The reader should note the significance of the wide range of support from key IT vendors for this enhanced TCO model. We are hopeful—and confident – that TCO Analyst methodology will quickly become the TCO standard for the industry. Finally, it should be noted that we view the TCO Analyst as a work-in-progress, which we will improve over time as we receive input from users of the model.

The next sections describes each of the new elements of the TCO Analyst methodology.

3.2 Modular TCO Architecture

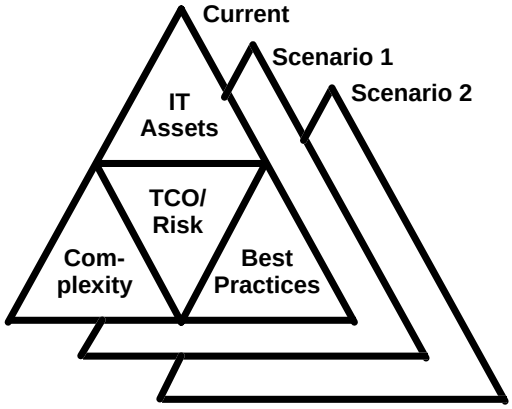
The current GartnerGroup TCO model is a two-dimensional matrix that includes a detailed itemization of costs associated with ownership and operations of computer systems. It provides an industry-average TCO estimate per seat using standard assumptions, such as worker type, number of applications and complexity of the IT environment. There is no provision to link modules, account for variability in organizations or estimate the impact of modifications to the IT infrastructure.

TCO Analyst methodology, in contrast, is a multidimensional framework that provides end users with cost scenarios to more closely profile different IT environments. These scenarios may be used to compare and contrast different computing platforms, different platform usage/deployment, and various "best practices" using a wide range of assumptions.

Specifically, the TCO Analyst consists of objects that may be "snapped" together to provide as much detail on TCO as required by the user. Instead of creating one industry average cost figure, the user builds a custom TCO estimate by creating a more comprehensive view of the enterprise. The TCO Analyst then "scales" cost data to provide a "tuned" TCO figure that reflects the unique characteristics of that environment. The TCO figure also reflects the degree to which best practices are utilized by the organization. In addition to cost data, the TCO Analyst also provides a risk profile that reflects both operational and implementation risk. The result is a "risk-adjusted" TCO estimate which provides a baseline of information for investment and management decisions in IT.

Multiple scenarios can then be created to compare what happens if different technologies are deployed, if complexity is reduced or if service levels are altered. By comparing the alternative scenarios against the current environment, the user can now easily quantify the impact of various choices to optimize against stated objectives.

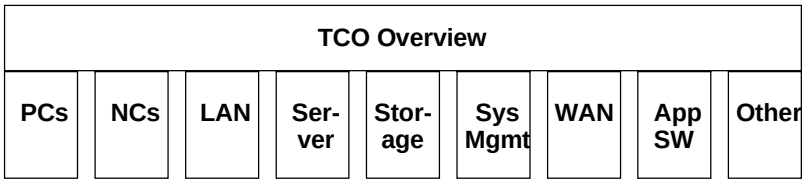
Figure 3. TCO Analyst—Architecture



Source: GartnerGroup

The user may separately and independently select the technology platforms in the TCO Analyst. Each technology is described by a "standard" degree of functionality that may be enhanced. These platforms map to the GartnerAnalytical product architecture, permitting each GartnerGroup service to contribute to a comprehensive TCO methodology and provide the user with an enormous amount of supporting research and advice.

Figure 4. TCO Analyst and Technology Modules



Source: GartnerGroup

3.3 Consistent Chart of Accounts—Collaboration with Interpose

GartnerGroup's current TCO models use a chart of accounts which are based on an information systems (IS) functional perspective of computing. Each of four categories is composed of numerous subcomponents as shown below.

Figure 5. GartnerGroup TCO Chart of Accounts

1. Capital	**3. Technical Support**	**Technical Support** *(Cont'd)*
Hardware	Tier 1 Help Desk	Technical Training
Software	Documentation	IS Network Learning
IS Allocated	Data Extract	Software Distribution
Network	Configuration Review	NOS Maintenance
Desktop	Application Consulting	Disk Management
Server	Vendor Liaison	Security/Virus
2. Administration	Standards Development	NOS Configuration
Asset Management	End-User Training	NOS Performance Management
Security	Product Introduction	**4. End-User Operations**
Legal	Product Review	Data Management
P&P Enforcement	Newsletter	Applications Development
Formal Audit	User Group	Formal Learning
Informal Audit	IS Desktop Learning	Casual Learning
Client Purchasing	Planning	"Futz" Factor
Installation	Utilization Review	Client-Peer Support
Capacity Planning	Install/Move/Upgrade	Network Costs
Adds, Moves and Changes	Service/PM (outsourced)	Network-Peer Support
Upgrades	Install Network	Misdiagnosis
Server Purchasing	Tier 2 Support	Peer Training
Security Administration	Tier 3 Support	Supplies
NOS Administration		

NOS: Network Operating Systems P&P: Policy and Procedures

Source: GartnerGroup

For the TCO Analyst methodology, GartnerGroup has decided to adopt the terminology used in the Interpose TCO chart of accounts (developed by Interpose in conjunction with Microsoft) for two reasons. First, it more clearly distinguishes between budgeted and unbudgeted costs, and second, it explicitly includes costs associated with end-user downtime. As the Interpose approach was built with the GartnerGroup research in mind, the underlying subaccounts in the two models are quite similar. Firms that may have created their own TCO models using GartnerGroup's TCO chart of accounts will be able to easily move from their current model to the TCO Analyst.

Figure 6. Interpose TCO Chart of Accounts

Direct (Budgeted) Costs

- Hardware and Software—The capital expenditures and lease fees for new installations, and upgrades of servers, clients, printers, and network communication devices.
- Management—The network, system, and storage management IS labor and professional services outsourcing fees.
- Support—The help desk support labor, training labor and fees, procurement, travel, maintenance and support contracts, and overhead labor.
- Development—The application and content development, test, and documentation including new developments, customizations, and maintenance of non-business applications.
- Communications Fees—The lease line, server access charges, and allocated WAN expenses.

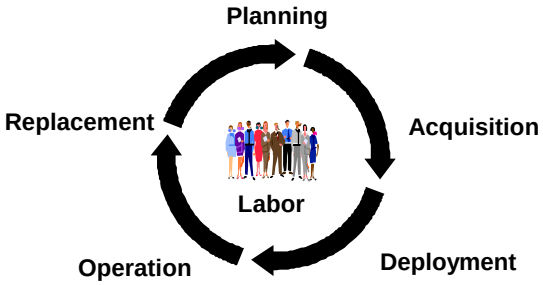
Indirect (Unbudgeted) Costs

- End User IS—The cost of end users supporting themselves instead of relying on IS support (peer and self support), casual learning (non-formal training), and end user self-development of applications.
- Downtime—The lost productivity due to planned and unplanned network and system unavailability, measured as lost wages.

Source: Interpose

The TCO Analyst methodology also permits a view from a technology life-cycle perspective, as illustrated below.

Figure 7. TCO Life-Cycle Framework



Source: GartnerGroup

Finally, the TCO Analyst methodology will also permit the inclusion of deployment costs and consider a common time layout and framework of five years.

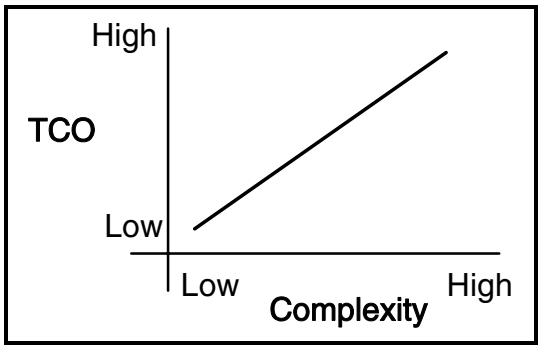
3.4 Addition of IT Complexity

Complexity associated with IT management and infrastructure in an organization is a major factor driving TCO; it also impacts the effectiveness of TCO enablers and best practices (e.g., systems management technologies). From a total cost of ownership perspective, more complex organizations and/or IT installations can expect higher planning, implementation, deployment and retirement costs associated with a wide variety of technologies (e.g., PCs, servers, applications, etc.). IT infrastructure and the

people responsible for managing IT are all part of an intricate system of relationships and dependencies. The more varied the components associated with the system (e.g., number of operating system platforms, for example) as well as the more undefined management processes (e.g., undocumented problem management process), the more resource (and therefore cost) is needed to support the system.

However, more complex IT environments also tend to enable *greater* return on investment opportunities associated with TCO enablers than less complex environments. This is primarily due to the fact that highly complex IT infrastructures (from a labor perspective) are difficult to manage and therefore are often *not* cost-effective. The result is that more-complex IT infrastructures often offer more inherent savings opportunities to exploit. TCO enablers for this complex environment (e.g., event management systems) can significantly assist in both speeding the analysis and resolution of network problems, thereby allowing valuable employees to work on higher value-added issues. (See Figure 8). The TCO Analyst methodology today measures only costs, not benefits beyond cost savings, however.

Figure 8. The Impact of Complexity on TCO



Source: GartnerGroup

Overall complexity stems from two main complexity categories: management and IT infrastructure. Management refers to *how* overall IT operations are managed, and IT Infrastructure *defines* an environment to manage as well as technologies which enable management. These two categories are not always mutually exclusive; often, management complexity drives IT infrastructure complexity. Overall, we believe that management complexity drives approximately 75 percent, and IT infrastructure 25 percent, of the factors leading to the differences between most and least-case costs associated with managing IT environments.

3.4.1 Management Complexity

Management complexity can be influenced by a range of factors, including (but not limited to): the degree of management centralization, budget control processes, change management processes, problem management processes, planning processes,

service availability levels, service levels, number and type of end users, and the relative dispersion of end users (See Figure 9). In order to rate overall management complexity, each complexity variable is 'scored' and weighted in importance.

Figure 9. Management Complexity

Management Structure	Highly Centralized ← Less complex		Dispersed		Highly Decentralized → More complex
Process Maturity	Have, use, document, to manage and optimize IT processes	Have, use, and document to manage IT processes	Have, and use document IT processes	Have and use IT processes	Have IT processes
End-User Dispersion	Highly centralized		Campus		Highly decentralized
IT Service Availability	5x8	6x9	7x12	7x15	7x24
IT Service Levels	Next day / best effort	Next day guaranteed	Same day guaranteed	Within 4 hours	Immediate (<30 minutes)

Source: GartnerGroup

3.4.2 IT Infrastructure Complexity

We divide an organization's IT infrastructure complexity into two groups: software and hardware. Software complexity is derived from a number of variables including: the percentage of applications that are client/ server (split application logic), the total number of distinct operating systems, the average maturity of installed client/server applications, the percentage of total applications that are enterprise-critical (e.g., specific applications that affect the necessary operations of multiple departments within the enterprise), etc. (See Figure 10).

Figure 10. Example of Factors Determining Software Complexity

	Less Complex → More Complex				
% of Apps. That Are C/S	20 or less	40	60	80	100
No. of Distinct OS Platforms	1	2	4	6	>6
Avg. Length of Installed C/S Apps.	3 months	6 months	12 months	24 months	>30 months
% of Apps. That Are Enterprise-Critical	20 or less	40	60	80	100
% of Apps. That Are Personal Productivity	100	80	60	40	20 or less

Source: GartnerGroup

Hardware complexity is also influenced by a number of factors including: The number of distinct hardware architectures, the PC turnover rate (the percentage of PCs or workstation bases that have been replaced or upgraded within the past 12 months, excluding efforts to standardize on any particular platform), the mobile unit adoption rate (the percentage of user devices that are portable or mobile), high-availability provisions (the percentage of servers, hubs, routers, etc., with redundant elements), etc. (See Figure 11).

Figure 11. Example of Factors Determining Hardware Complexity

	Less Complex → More Complex				
No. of Distinct Hardware Architectures	1	2	4	6	>6
Annual PC Turnover Rate	10% or less	20%	50%	70%	100%
Redundancy (% of servers, hubs,routers with redundant elements)	100	70	50	20	10 or less
% of Mobile/ Portable Users Devices	10 or less	20	50	70	100

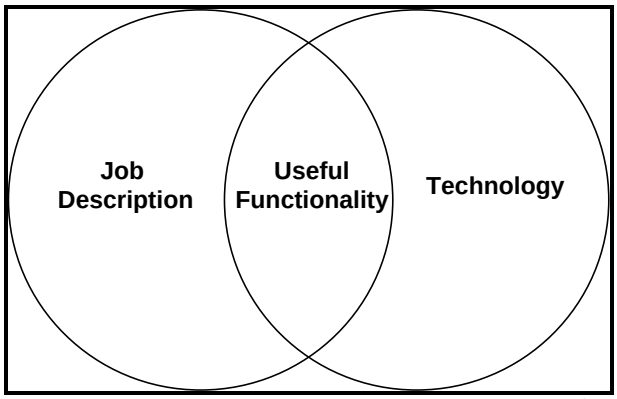
Source: GartnerGroup

In order to rate overall IT Infrastructure complexity, each complexity variable is 'scored' and weighted in importance by the TCO Analyst. Thus, although the assumptions associated with the TCO model determine least and most costs, the degree of management and infrastructure complexity determine where *within this range* a user can expect costs or savings to be. Likewise, each TCO enabler has a range of effectiveness in *lowering* TCO. Complexity helps determine what impact TCO enablers and their implementation actually have in lowering costs.

3.5 Addition of Worker Type

The original TCO model made simple assumptions about the type of worker using the computer systems and addressed only the knowledge worker. The knowledge worker rose out of the age of personal productivity (1980 to 1990) and is exemplified by having at least one PC, a suite of software (often personally chosen), access to corporate data and, lately, external access to the Internet and other value-added networks. We believe it is dangerous to define workers by the technology they use, since it may not map to their job function (see Figure 12).

Figure 12. The "Vulcan Mind-Meld" of Technology and Job Description



Source: GartnerGroup

Workers who are defined as such will be more likely to do what the technology will enable them to do, rather than what is optimal based on their job description. This is particularly true when the employee's job description is fuzzy, poorly defined and subject to change. The technology becomes the stabilization point for this person's work environment. In a world of poorly defined work roles, a precisely defined technology environment will dominate.

To accommodate different types of users, we have added a simple—but effective—list of job functions that will complete the profile of the enterprise. These job functions also contribute to the risk profiles. We define classes of workers as:

High Performance—Workers who perform high-value, mission critical tasks, like stock traders, engineers or direct contact customer service workers where there is a high dependency on technology and a high cost of downtime.

Mobile—Workers that are on the road and in the field, often high performance workers with fragile mobile technology. Again, there is a high dependence on technology and a high cost of downtime.

Knowledge—Perhaps the most poorly defined yet most publicized class of worker. Defined as a worker who gathers, adds value to and communicates information in a decision support process. Cost of downtime is variable but highly visible.

Structured Task—Workers who perform the same tasks repetitively, typically as a link in a workflow or process. Cost of downtime varies, most workers are only partially dependent on computer availability.

Data Entry—Workers who input data into computer systems.

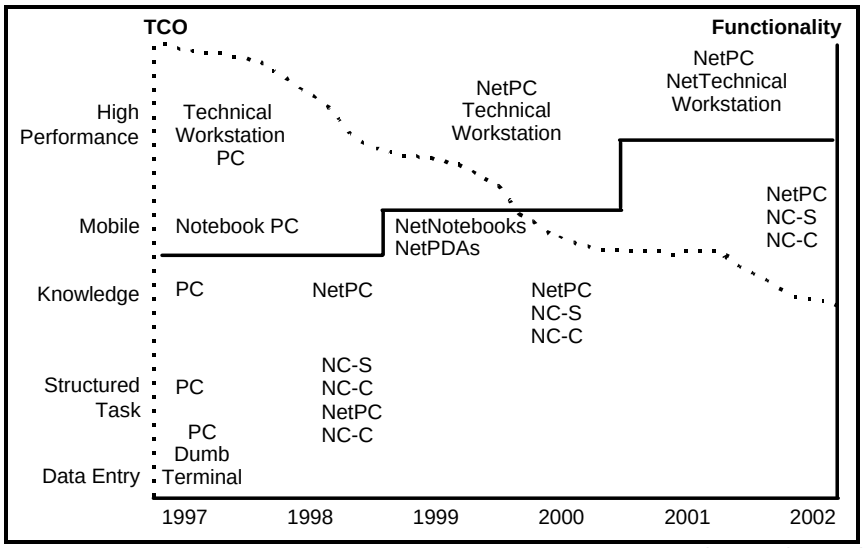
Source: GartnerGroup

We believe that a typical organization is composed of only a small number of knowledge workers. This means that the rest of the employees are improperly equipped. It is almost as inappropriate to provide a worker with too much functionality as not enough. Functionality adds complexity, complexity adds cost. If most of the workers have too much cost and complexity, it is very difficult to make a business case for PCs—even the high payback for the knowledge workers will be difficult to justify.

We believe that it costs about $10,000 per user per year to own and operate a personal productivity PC (Windows 95 on a LAN). For a 2,500-user installation, this represents an annual cost of $25 million. But only 10 percent (for example) of the population really needs all this flexibility, and at a cost of $2.5 million probably contributes at least that amount to the business. However, the other $22.5 million is suspect: it would seem that a reduced complexity and lower cost device would be appropriate for the rest of the workers with less functional requirements.

Enter the NetPC and other network computing solutions. We are witnessing a blossoming of devices, many of which are architecturally compatible with the dominant “Wintel” platform. These devices represent a spectrum of devices that scale in functionality, flexibility, complexity and cost (see Figure 13).

Figure 13. Applicability of PCs and Alternatives, 1997 to 2002



Source: GartnerGroup

We are now positioned to choose how much functionality a user has access to and where that functionality resides. We have the ability to match the cost of technology with the benefits the enterprise (not necessarily the end user) derives from a computing platform without significantly compromising on standardization, interoperability and system manageability. Everyone does not have to be equipped as a knowledge worker or a data entry clerk. The TCO Analyst methodology will accommodate this point.

3.6 Addition of TCO Enablers and Best Practices

Best practices are the proper deployment of technology integrated with process and management practices that deliver maximum usable functionality at minimum cost. These best practices are enabled by critical technology, or TCO enablers. Typically, this technology by itself has no intrinsic value, but if properly used, it can help to reduce costs. However, the deployment of technology has both costs and value. Poor implementation occurs when the costs outweigh the benefits, producing negative value. Technology itself is seldom to blame, most often it is a poorly scoped implementation or the failure of the organization to integrate technology into a process that causes poor value.

We believe that best practices can lead to cost reductions of about 30 percent and increase utilization of functionality as well as user satisfaction. For example, software tools (e.g., asset discovery tools), groups or packages of functionality (asset management, technical support) used in conjunction with processes and policies (software compliance) can reduce both cost and risk.

We will assess the impact of a selected group of TCO enablers and best practices as they impact the IT systems. The items listed

below are for illustration purposes and will likely be modified over time.

Figure 14. TCO Enablers and Best Practices

Hardware

- DMI 1.1 Compliance
- DMI 2.0 Compliance
- SNMP Compliance
- Remote New System Setup
- Remote Wakeup
- Power Management
- Universal Serial Bus
- NetPC
- Hardware Instrumentation (Sensing and Alerting)
- Physical Security

IT Management Software

- Systems Management Software
- Electronic Software Distribution
- Inventory
- Asset Management
- Backup and Recovery
- Remote Monitoring
- Help Desk Automation
- Virus Protection
- Event Management
- Capacity Planning
- Performance Monitoring
- Software Security

Training

- IS Training and Certification
- End-User Training

Source: GartnerGroup

To capture the incremental contribution of a number of factors required to achieve the optimum benefit from the list of TCO enablers, we have developed a sliding scale of best practices implementation, the "TCO Amplification Effect," to illustrate how technologies should be appropriately used. Used in isolation, many technological innovations contribute little to cost reduction. However, as enterprises begin to systematically use new functionality, such as manageability, in conjunction with systems management tools, savings mount. Savings continue to increase as this functionality is incorporated into the organization's IT policies and practices. Thus, the TCO Amplification Effect is a metric that defines and quantifies the TCO impact of technology and best practices based on their level of implementation in an enterprise.

Figure 15. TCO Amplification Effect

No Technology Present—The absence of any Best Practice in a specific area.

Technology Present—The raw material of an IT infrastructure. This may be hardware, firmware, software, wiring, or any combination of these. Technology is always a capital expense or a development cost. Technology is at the base of the amplification scale; an example is DMI (Desktop Management Interface) compliance.

Tools to Use Technology—A tool is a construct that takes advantage of a technology. It may be another technology, including software. The instrumentation layer is a tool that makes DMI available to exploit.

Processes that Use Tools and Technology—A process is a "series of actions, changes or functions bringing about a result." When the tool is embedded in a process, the appropriate use of the tool is defined. A set of procedures that monitors the instrumentation layer and defines actions based on events recorded is a process that adds value to the tool and technology.

Policies that Implement Processes, Tools and Technology—The business rules that govern the conduct of employees and state the intentions of the enterprise. This is the code of operations of the business. To the degree that a policy exists that one of the other tiers supports it becomes a factor in the impact of that policy. A policy that cannot be enforced is moot. For example, a policy on software license compliance is ineffective without a process, tools and technology to enforce that policy.

Source: GartnerGroup

The reader should note that we have consciously limited our cost model to IT-related cost activities and do not account for business value other than downtime. However, the next logical extension of the TCO Amplification Effect is the impact of properly implemented IT on core business activities. The complete analogy is the butterfly spreading its wings in Connecticut and creating a tidal wave in the Pacific.

3.7. Addition of Risk as New Metric in TCO Analysis

To date, the GartnerGroup TCO models have provided users with cost as the primary metric for evaluating their computing environments. While this is helpful, a pure cost analysis can lead to erroneous conclusions. For example, software asset management is a pure cost/risk exercise. If only direct costs were considered, software compliance would be deemed impractical. However, a risk adjusted cost evaluation has merit and would clearly justify the expense of the asset management process.

Thus, with the TCO Analyst methodology, we add risk as a new metric. Generally speaking, risk is the potential cost associated with an event. Certain events can have disastrous effects but are very rare (e.g., millennium bug), others are more frequent with less impact (hackers). Some are frequent and have high potential for cost (viruses).

We have adopted this notion of risk to address primary types of risk: implementation risk and operational risk. While implementation risk is associated only with the deployment or implementation of technology and has a finite duration, operational risk is an ongoing measure of the IT environment. Each is incorporated into the TCO Analyst and is described in more detail below.

3.7.1 Risk of Implementation

Risk of implementation is important to evaluate because many organizations disregard the risks of implementation failure and instead concentrate on the benefits of success. Optimism makes for a good personal trait but not necessarily an effective investment strategy. To guard against financial loss, therefore, risk should always be factored into the analysis of a technology investment. This is especially critical when considering investments in TCO enablers, since often the sole reason for investing in these technologies and processes is to lower costs of managing the IT infrastructure.

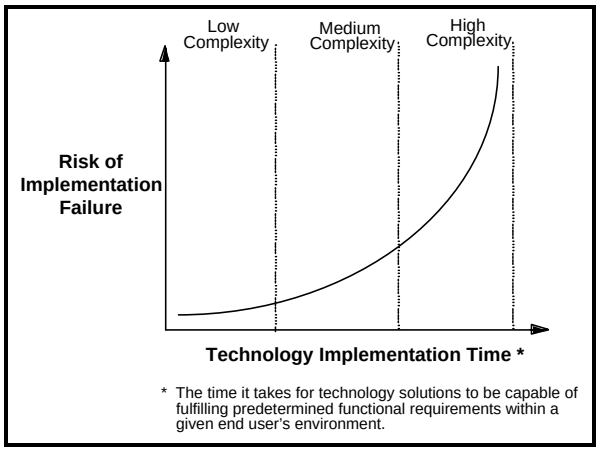
There are two main categories of risk which drive technology implementation failure rates: The risk introduced by the user, and the risk introduced by the vendor.

Vendor-Introduced Risk: Vendor-introduced risk associated with a range of IT investments is the result of several main factors including (but not limited to): The dynamics present in the vendor's marketplace (e.g., an immature marketplace tends to drive marketing wars between vendors, often at the expense of research and development dollars which could have otherwise driven the development of more robust technical solutions), the inherent useful life of a technical solution (the shorter the useful life, the more risky the investment as there is less time to realize a benefit resulting from the investment), the degree of available service and support offered by the vendor, the version release of the vendor's product (i.e., early technology versions are inherently more risky than more stable product versions). When planning technology acquisitions (especially TCO enabler investments), therefore, vendor-introduced risk should be factored into the investment decision.

User-Introduced Risk: There are a number of technology implementation risk factors users introduce. The most important and significant factor which drives technology implementation failures (including TCO enabler technologies) hinges on the complexity mentioned in the previous section. The more complex the IT management and IT infrastructure, the more probable it is for an organization to fail in implementing a range of technology solutions. Management complexity is especially critical in the implementation stage, since most (if not all) technology

implementations require significant amounts of process definition and staff coordination (See Figure 16).

Figure 16. The Relationship Among User Complexity, Probability of Achieving ROI



Source: GartnerGroup

Beyond complexity, there are a number of other key factors that consistently inhibit successful IT implementations, including:

- Too many defined goals associated with one project,
- Lack of senior management justification review for the technology project,
- Inadequate Piloting and Testing,
- Lack of dedicated sponsors for technology implementation,
- High rates of employee turnover,
- High rates of systems integrator turnover, and
- Lack of alignment on internal goals.

Like a financial investor, therefore, technology investors must always be conscious of the risks of failing to successfully implement technology solutions. For if risk is not considered, projects which were designed to reduce TCO may in fact increase TCO.

3.7.2 Operational Risk

Operational risk is risk that threatens the operation of the enterprise. To the degree that IT becomes an embedded part of operations, IT can mitigate or create risk.

Figure 17. Five Categories of Operational Risk

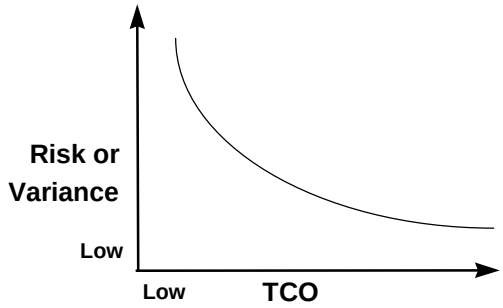
1. Performance/Downtime—Business exposure resulting from operation disruption caused either by system outages or delays, often a consequence of faulty enterprise system planning/ design (i.e., not natural disasters).
2. Data Loss/ Corruption—Business exposure resulting from inadequate system controls including: data storage, back-up and data integrity provisions.

3. Security/Theft—Exposures to the business resulting from inadequate security provisions including (but not limited to) inadequate or incomplete: authentication, authorization, system integrity, audit and confidentiality controls.
4. Business Recovery—Exposure resulting from the inability to effectively resume fundamental business operations after the occurrence of extraordinary events, most often natural disasters.
5. Legal Compliance—Exposure resulting from enterprise inability to effectively comply with (and manage to) conditions which would otherwise discourage a range of legal action (e.g., non-compliance with Federal Reserve OCC and UCC4A financial regulations for financial institutions. Inadequate security provisions internal to the enterprise, leading to enterprise prosecution of potential perpetrator). Legal risk can range from individual to enterprise liability.

Source: GartnerGroup

The goal is to accurately describe the relationship between risk of downtime and cost, and minimize chance of implementation failure. Generally speaking, we believe risk reduction requires investment in IT and the job of IT management is to weigh this tradeoff and evaluate technologies from this, among other, perspectives. We are aware, however, that by investing in certain technologies/processes, the enterprise may be able to determine that both cost and risk can be simultaneously reduced.

Figure 18. Risk/Cost Relationship



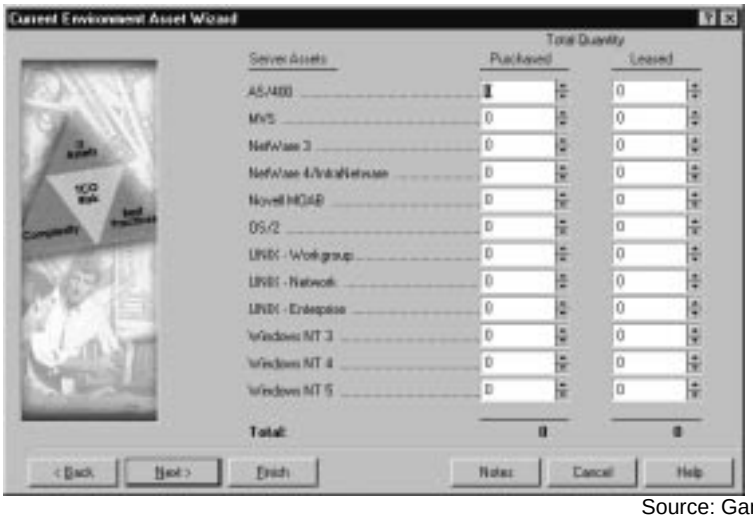
Source: GartnerGroup

3.8 Compilation of Quantitative Information into TCO Analyst Software Prototype

Since the inception of the TCO model in 1987, GartnerGroup has counseled its clients to use the TCO estimates as guides to understand the most important actions they can take to reduce costs. Since actual savings vary among enterprises (due to unique environments and differences in labor rates, funding, accounting practices and implementation strategies) we have suggested that firms build their own TCO models. To assist in this process, GartnerGroup has made its TCO research available to clients in the form of spreadsheets and Research Notes. The TCO Analyst methodology will make this process much easier and more accurate.

Working with Interpose, a leading TCO software developer, we created a prototype as a proof-of-concept for the new GartnerGroup TCO methodology. This prototype illustrates a common interface to all the GartnerGroup TCO models and shows how users could create custom TCO estimates using a highly structured methodology. Included in the TCO Analyst prototype is a wide array of proprietary information on the cost elements of TCO, 'scalers' to permit customization, and quantitative output on cost and risk. By combining GartnerGroup's ground-breaking theoretical research on TCO with Interpose's practical adaptation of this research, we believe we have created a prototype for a truly powerful tool to help evaluate computing technology and best practices. As a prototype, the TCO Analyst is today a work-in-progress which we plan to improve as we receive commentary on our efforts.

Figure 19. TCO Analyst Prototype—Screen View



Source: GartnerGroup

3.9 Inclusion of GartnerGroup Research into TCO Analyst Software Prototype

In addition to its quantitative abilities, the TCO Analyst software prototype supports the delivery of relevant written GartnerGroup

research on TCO and related topics. Built-in hyperlinks permit users to easily review a simple definition, or find more detailed research on topics ranging from technology (remote wake-up) to higher-level management issues on IT (importance of weaving the IS organization into the fabric of the enterprise.) The prototype also supports personal annotations created by the user about key assumptions that would otherwise be lost in unwieldy spreadsheets. Finally, by permitting rapid creation of detailed written reports, the TCO Analyst prototype illustrates the ease by which users can communicate assumptions, conclusions and recommendations with their peers and management. We anticipate this could lead to better decisions to lower computing costs.

Section 4

Conclusion

With great expectations we launch into a new era of IT cost analysis, leveraging a decade of research on the total cost of computing. We are proud that we have established a leadership role in TCO analysis, but are humbled by the impact TCO has had on the industry. We have coached hundreds of companies through the analysis, worked with many vendors to shape their products with a TCO vision, and we are gratified that we have lead the way to establish a new industry metric.

We also know that much remains to be done on this methodology beyond what we have outlined in this white paper. For example, we have yet to address the other side of the value scale: business benefits. This remains a thorny and elusive topic, yet it is often the real driver of IT investment. Without a true measure of benefits, we have only half the picture.

In the meantime, we hope this new TCO methodology and software prototype may lead to new opportunities for research and the practical application of good ideas in IT management and solutions creation.