Strong movement toward recentralization of computing resources (0.3 probability)

Internet transforms into a new model, reshaping the players and the industry — before 2000 (0.4 probability); before 2005 (0.6 probability)

Moore's Law is no longer attainable by 2000 (0.2 probability); Moore's Law becomes irrelevant to the overall cost trends of IT (0.8 probability)

Governments assume role of software regulators (0.2 probability)

End-user technology backlash dramatically reverses current trends (0.3 probability)

Source: Gartner Group

Users must continue to grapple with fear, uncertainty and doubt (FUD) generated by vendor discussions of product futures, expansive architectural initiatives, unsubstantiated performance claims, and confusing and contradictory alliances, partnerships and acquisitions. New products and technologies are emerging at an accelerating rate. Seemingly mature and stable products and companies are faltering, disappearing or being acquired. Media and analytical reports offer evidence of both success stories and horror stories of various experiences with client/server computing, object-based technologies, networked systems management products, workgroup products and various development strategies. For all organizations, sorting out the relevant strategy offers significant opportunities for breakthrough improvements and potential risks of system failure, cost overruns and unmanageability.

In addition, users must continue to monitor the "wild card" scenarios. These are scenarios that are counterintuitive or which Gartner Group still rates with fairly low probability, but not impossible. Furthermore, any one of these scenarios would have dramatic and widespread impact on the entire industry.

1. **Which technologies will offer the greatest payback during the next five years?**

2. **Which vendors will survive the turmoil in market and technology evolution to emerge as market leaders in 2000?**

3. **What strategies should IT users implement to maximize investments and reduce the risk of complexity?**

Technology will continue to be a dominant change factor. Even more critical, technology is becoming an enabling factor in all enterprises, creating opportunities for increasing the impact of IT as well as risks of creating a chaotic and unmanageable environment

Overall IT purchases are expected to reach $1.3 trillion by 2000.

IT expenditures in enterprises will grow from a CAGR of 16 percent to represent more than 9.2 percent of revenues in 2000. However, the majority of these expenditures will occur in end-user departments as "hidden costs."

Worldwide corporate downsizing and government consolidation and privatization will trigger a major shift toward contracted work forces and "virtual corporations."

Which technologies will offer the greatest payback during the next five years?
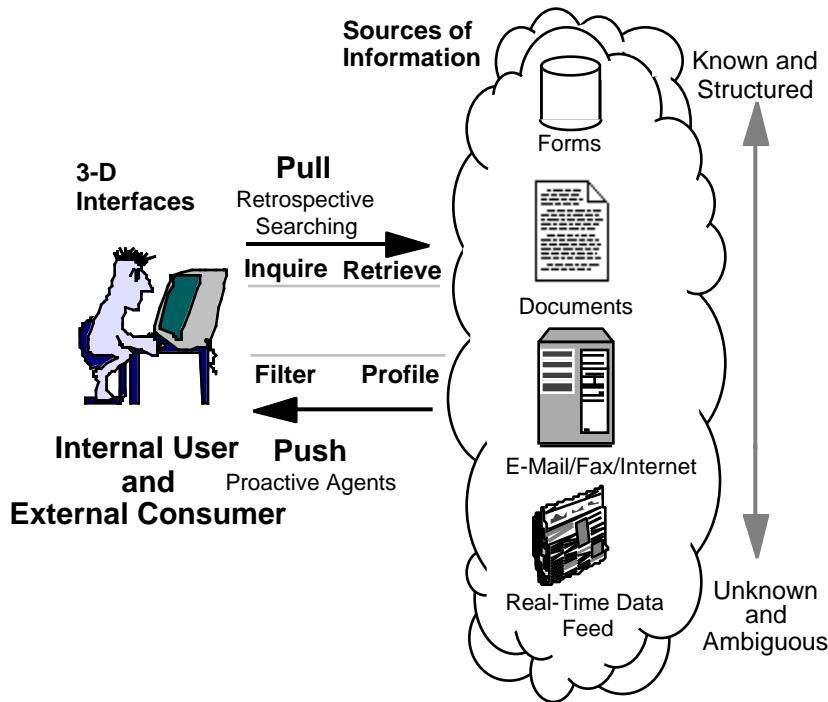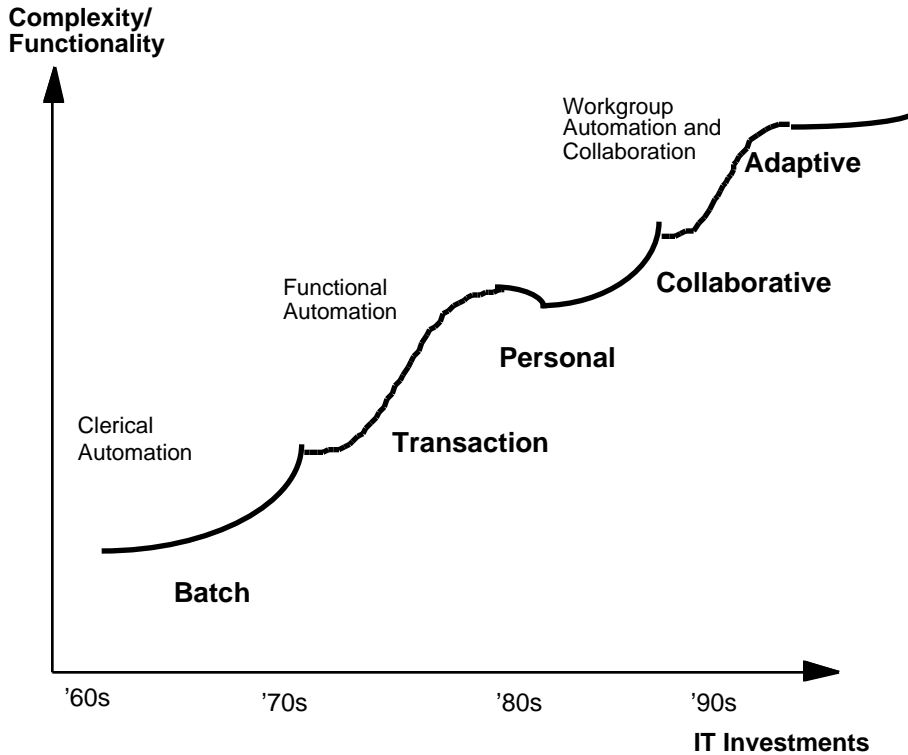
Source: Gartner Group

During the next five years, the industry will undergo key inflection points where the confluence of product and market maturity will produce a payback sufficient to warrant the investment. New applications succeed by embracing the natural habitat of the end user — employing multimedia, mobile technologies and personalized, easy-to-use workplace tools. Where the customer is the targeted user, technologies must integrate into personal consumer habits. Broad access to information over global networks and stored in huge databases must be balanced with an appropriate "knowledge architecture" providing intelligent agents, browsers, indexes, artificial intelligence and other preprocessing and data-mining technologies. In addition, one of the prime sources of IT value is found in an infrastructure of reusable application components and flexible system components that permits quick delivery of new capabilities. Communication-laden collaborative analysis, too, lends itself to value identification and creation, and depends highly on a robust IT base to make it effective. Technologies that support these (multimedia, information storage and retrieval, messaging infrastructure and mobile communications services) will come to dominate the IT market.

By 2000, more than 50 percent of today's application portfolio will need to be redesigned to enable a communications-centric world environment (0.7 probability).

Reader Notes

**Complexity/
Functionality**

Workgroup
Automation and
Collaboration

Adaptive

Functional
Automation

Collaborative

Personal

Clerical
Automation

Transaction

Batch

'60s   '70s   '80s   '90s

IT Investments

Source: Gartner Group

Key Issue: Which technologies will offer the greatest payback during the next five years?

As we look ahead to 2000, applications will be a hybrid of previous investments plus advanced technologies including multimedia, information and retrieval, messaging infrastructure and mobile communications services. The challenge to organizations will be harnessing rapidly evolving technological capability and satisfying increasingly demanding and sophisticated end users by focusing on the quality of the combined application base and the architecture for delivery of application services. This "information infrastructure" must be managed for cost of operation and ownership, and allow for timely, flexible change. The architecture inherent in most existing transaction systems does not allow for either of these to be sustained as the pace of external change accelerates during the next five years.
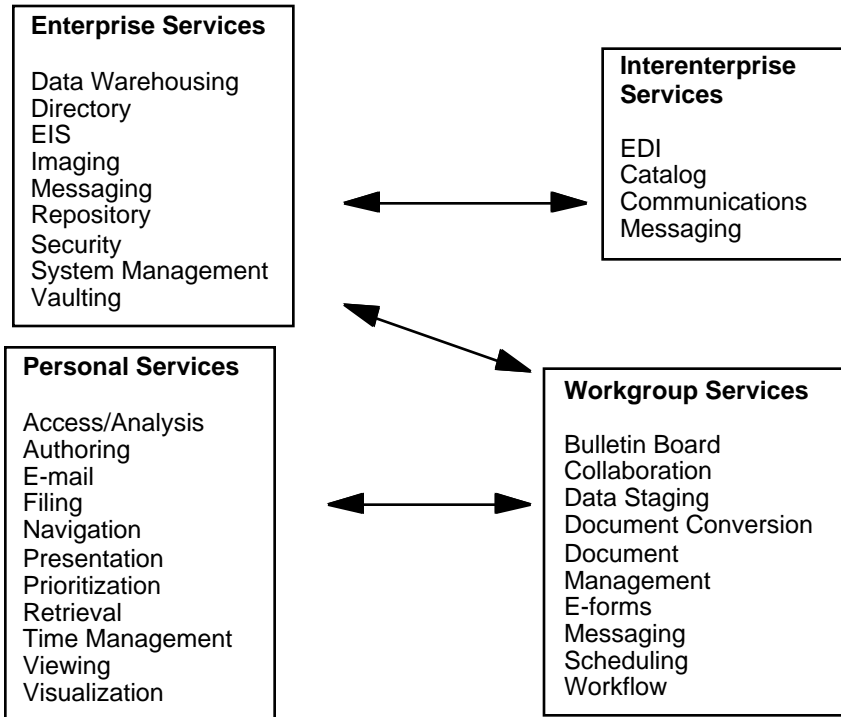
Physical distribution of the work force, mobile job requirements and the rise in telecommuting will place increasing demands on enterprise and public infrastructure requirements. There will be a subtle shift from "jobs," which are owned by the enterprise, to "workers," which require a specific placement of value for work done, and performance contracts and measurements for work assignments.

By 2000, the most strategic investment will be "interpersonal" computing services founded on a messaging infrastructure and application integration to enable the "electronic workplace" (0.8 probability).

Interacting, Enabling Services

Enterprise Services

Data Warehousing
Directory
EIS
Imaging
Messaging
Repository
Security
System Management
Vaulting

Interenterprise Services

EDI
Catalog
Communications
Messaging

Personal Services

Access/Analysis
Authoring
E-mail
Filing
Navigation
Presentation
Prioritization
Retrieval
Time Management
Viewing
Visualization

Workgroup Services

Bulletin Board
Collaboration
Data Staging
Document Conversion
Document Management
E-forms
Messaging
Scheduling
Workflow

Source: Gartner Group

Key Issue: Which technologies will offer the greatest payback during the next five years?

Low-skill administrative and clerical work (i.e., the "go-fetch" functions) are already beginning to disappear from corporate job descriptions, replaced by readily accessible, easy-to-use electronic capabilities. By 2000, this will extend to the traditionally labor-intensive middle management functions of monitoring and coordinating basic work activities through a more comprehensive set of services that will support the embedding of core rules of business conduct and process, as well as the metrics defined to measure progress and performance, and provide for the integration of these functions within LOB applications. The delivery of this electronic workplace requires much more than personal computing and workgroup applications.

IS organizations must begin laying the groundwork to enrich personal computing with a robust set of interpersonal, enterprise-scale services with a collaboratively planned, deployed and maintained infrastructure. Infrastructuresare generallynot connected to a single project. It is difficult, if not impossible, to assess benefits to an "infrastructure." Unfortunately, it is not difficult to determine costs. Building, operatingand maintaining an infrastructure is a significant investment and difficult to justify on a stand-alone basis. However, some level of infrastructureis essential for realizing all enterpriseproject goals.

By tracking a technology's progress along the "hype" cycle, organizations can determine when the technology's maturity reaches a point compatible with their own tolerance for risk.

Reader Notes

Hype Cycle of Emerging Technologies
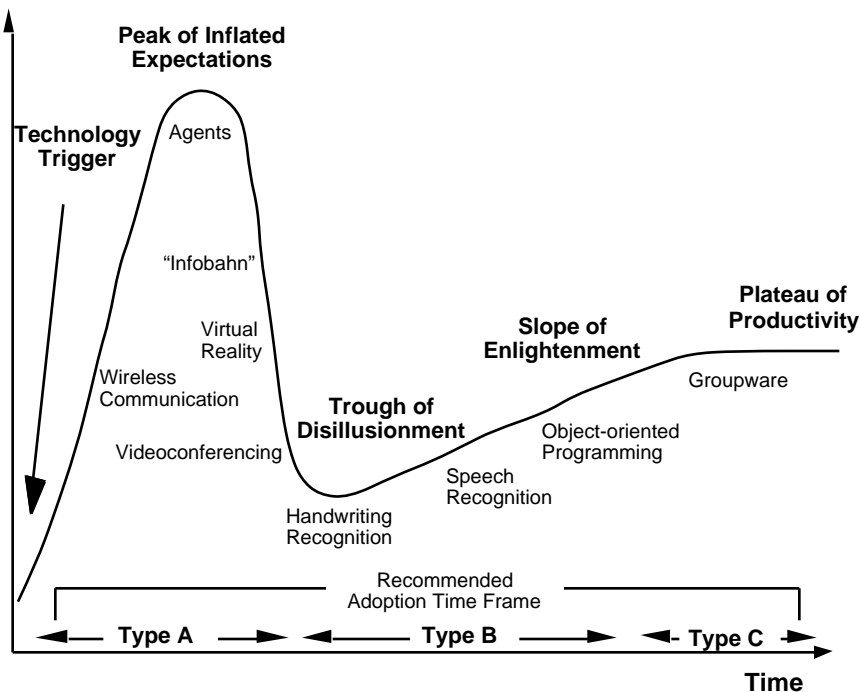
Source: Gartner Group

Key Issue: Which technologies will offer the greatest payback during the next five years?

Once an organization has decided (through specification and tracking activities) that an emerging technology will play a role in its future business processes, the organization must determine the optimal time to invest seriously in the technology. This is no easy task. If the organization launches its efforts too soon, it will suffer unnecessarily through the painful and expensive lessons associated with deploying an immature technology. If it delays action for too long, it runs the even greater risk of being left behind by competitors that have succeeded in making the technology work to their advantage. The problem can be eased significantly by understanding the "hype cycle" of emerging technologies.

The majority of advanced technologies follow a predictable life cycle of hype, disillusionment, realism and, eventually, productivity.

Technology payback will vary by user organization. User organizations must define their own strategies and standards. No pre-eminent industry solutions will emerge.

Reader Notes

Potential New Functional and Technology Payoff

	1	2	3
Communication Infrastructure Robust Nets Mail/Messaging Document/Data exchange	High	High	High
User Environment Personalized dev. Mobile Agents Multimedia	High	Medium -	Low - -
Strategic Information Applications Parallel DB Sys. RAID discs Data mining and Info. retrieval	High -	Medium	Medium
Collaborative Application Infrastructure Groupware Workflow Integrated Docs.	Medium	Medium	Low
Applications Development Technologies BPR, C/S, Modeling, Object-Oriented Tools, Enterprise CASE	High	Medium	Low
Management Technologies	Medium	Low	Low
Information Superhighway/ Electronic Commerce	Medium	Low	Low

Source: Gartner Group

Key Issue: Which technologies will offer the greatest payback during the next five years

It is time to anticipate the next round of investment. Major platform shifts are cyclical. As enterprises settle into new computing models, they are able to absorb change (this is the engine of the player switches). Therefore, IS organizations have a window of opportunity to restructure their portfolios into an infrastructure of application delivery mechanisms; if they can focus on appropriate strategic scenario, balancing risk, leadership and costs. Organizations that attempt to straddle the fence or misstep in changing strategies will find the fence jagged and painful. The next five years will be characterized by a renewed emphasis on governance and strategy, particularly in segments that evolved to the relative free-for-all of the last decade. Intensifying complexity and change will drive users to seek simplicity and structure. These solutions must be self-imposed. The IT industry will produce *no* definitive, lasting master platform. However, expectations must be scaled back. Investments in technologies designed to provide lasting and stable solutions for an enterprise will become more difficult to justify as they fail to meet unrealistic expectations.

Which vendors will survive the turmoil in market and technology evolution to emerge as market leaders in 2000?

Key Vendor Battlegrounds: 1995-2000

Higher levels of product integration (hardware, software, tools, application suites)

Object technologies (all types)
Service and support

Channels

Systems management and security

High-end database (includes parallel hardware implementation and in-memory databases)

Three-tier C/S and messaging middleware

Multimedia

Internet appliances and content

Consumer and entertainment exploitation

Source: Gartner Group

Market dynamics as the new millennium approaches:

• Breakdown of traditional justification methods.

• No "overarching" industry architectures or "plug and play."

• All vendors are "niche" but there will be few lasting or productive alliances.

• Software will not be "commoditized" and will retain significant value, but price points will change.

• Innovation and functionality is being sacrificed to retrofitting old capabilities onto new platforms. However, major platform shifts only occur every 10-15 years.

• Channel becomes an important issue, but as yet, undeveloped. New distribution channels must offer small-to-midsize application integration projects at cost-effective levels to compensate for shortages in internal skills and increasing number of vendor products to integrate.

• "Disposable technologies" drive purchasing decisions due to constant vendor churn.
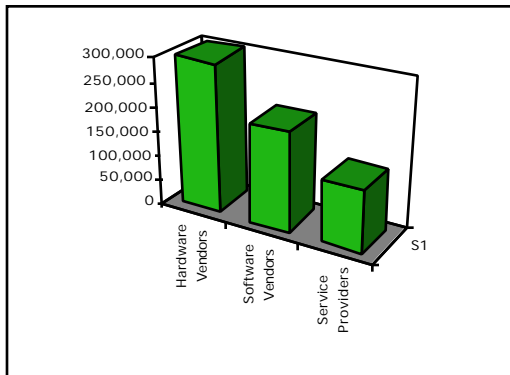
Shrinking profit margins will force vendors to become highly focused and reduce R&D, even as commoditization intensifies the struggle to find and fund lasting differentiation (0.8 probability).
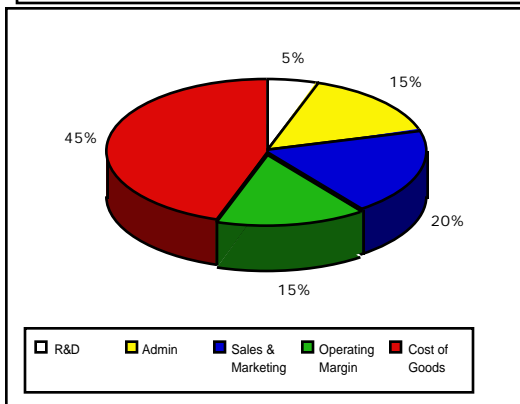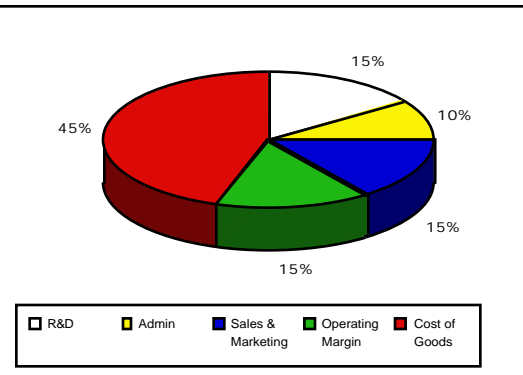
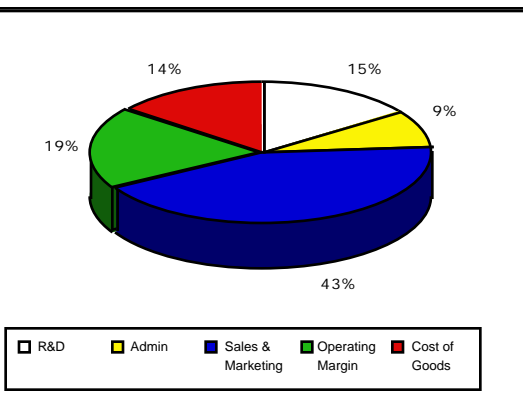**Healthy Revenues**

Healthy Financials for Hardware Vendors

Healthy Financials for Solution Vendors

Healthy Financials for Software Vendors

Source: Gartner Group

Key Issue: Which vendors will survive the turmoil in market and technology evolution to emerge as market leaders in 2000?

The Gartner Group scenario calls for an IT industry with increasingly powerful mega-players absorbing smaller suppliers that lack cash, distribution channels and/or new ideas, or that just want to cash in. At the same time, the scenario calls for the entry of many new players, most of which will be subsumed by bigger players. Accordingly, customers involved with start-up vendors should be mindful that eventually (three to seven years out) they will be talking to someone else.

Dominant prosperous vendors must offer complete solutions and enter new markets. Yet these vendors continue to lag behind breaking new ground as they are increasingly burdened by their installed base, commitments to existing paradigms, shrinking margins and R&D budgets.

More important than a vendor's size or vision is the business value of what it is shipping. Small players will continue to proliferate, opening niches of value; those that gain market share will be acquired by the "name brands." This ebb and flow of vendors and technology will eliminate any possibility of a lasting "master platform" produced by the industry.

"Midlife kicker" strategies must be replaced by a strategy of cannibalization. More than half the vendors will not successfully manage product transitions, creating a market of undying technologies by the year 2000 (0.7 probability).

Reader Notes

Product Life Cycle
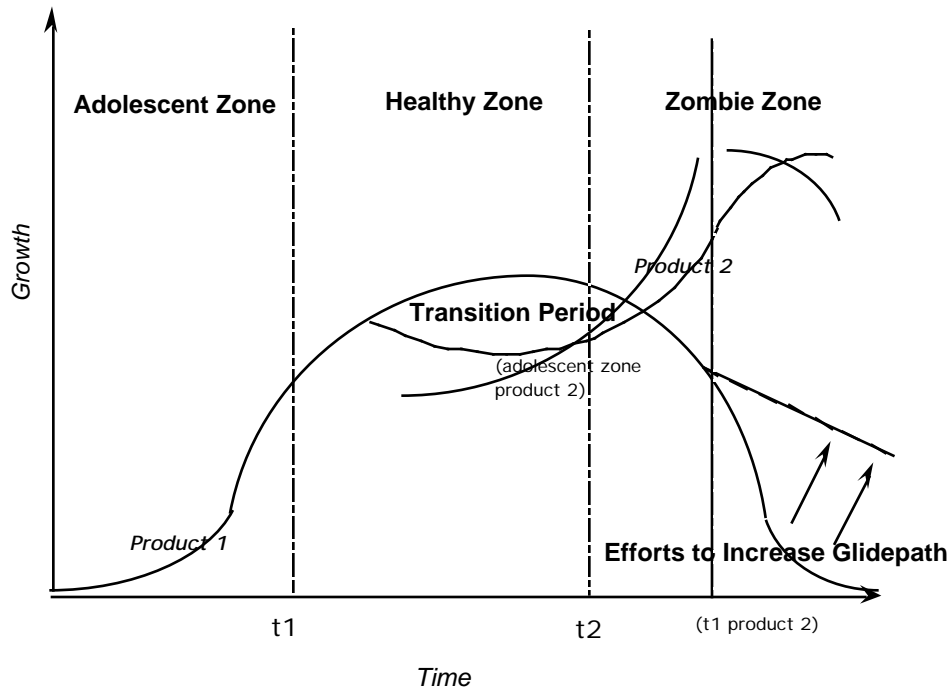
Growth

Adolescent Zone   Healthy Zone   Zombie Zone

Product 2

Transition Period

(adolescent zone product 2)

Efforts to Increase Glidepath

Product 1

t1   t2   (t1 product 2)

Time

Source: Gartner Group

Key Issue: Which vendors will survive the turmoil in market and technology evolution to emerge as market leaders in 2000?

To successfully compete, vendors must follow one of four strategies: 1) Actively introduce technologies that will obsolete their most successful products at the peak of the products' market penetration; 2) sell off products as market momentum stalls and reinvest R&D into new technologies; 3) cultivate a business model of buying and supporting "undead" technologies; or 4) provide customers with smooth transitions to new-generation products.

Strong vendors will continue to use their channels to push product churn into enterprises. IS organizations must work with IT buyers around the enterprise to build "rules of engagement" to respond to vendor hype, mergers and churn. New products that promise business returns should be aggressively installed and high cost-of-ownership zombies retired. For the intermediate cases, IS organizations must work out the means by which reasonable levels of coexistence can occur.
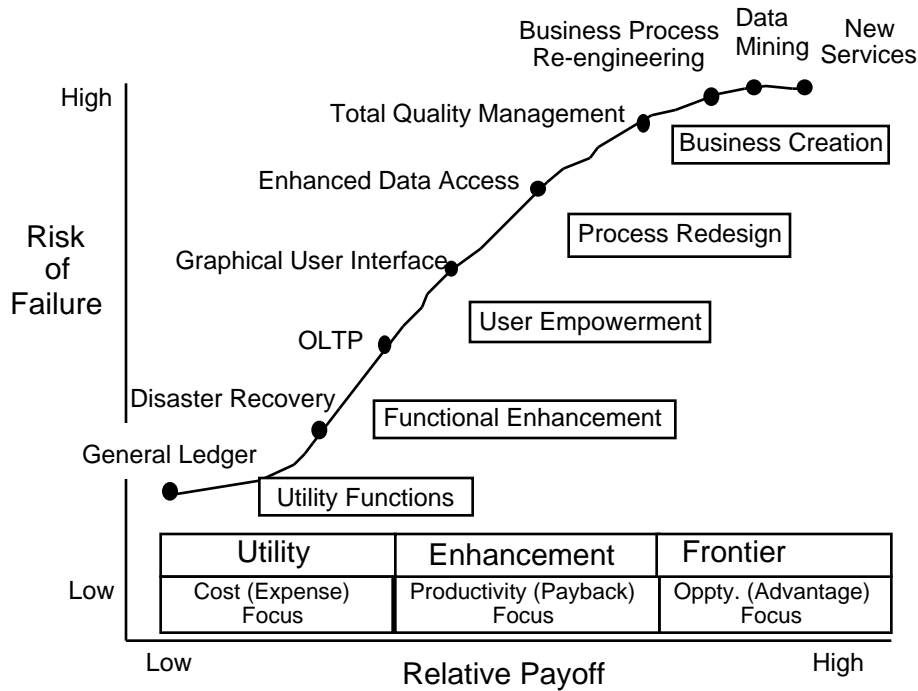
An enterprise's strategic dependence on a vendor will be greater in segments where products create architectural and cultural lock-in.

User "Investment" by Segment: 1995-2000

Financial Investment

NA telecom

Telecom Europe

Packaged apps.

PC hardware

Installation and maintenance

Telecom dev. countries

Consultants

NSM software

Database

Storage

Personal apps.

Enterprise messaging

Out-sourcers

Legacy systems

PC server

SI

PC OS

Enterprise dev. tools

LAN backbone

NOS

Remote access

Workgroup apps.

Dept. dev. tools

Server OS

Strategic Vendor Dependence

Source: Gartner Group

Key Issue: Will today's technology vendors survive, intact, to support businesses through 2000?

On the one hand, building partnerships with strong, solid vendors will minimize risks and reduce costs. A strong relationship with key suppliers will help to leverage purchasing power and build efficient supply chain strategies. It is less expensive to buy than build, therefore users must trust somebody. On the other hand, we recommend that users must develop vendor-independent strategies to remain flexible. Stable vendors become slaves to installed base and cannot navigate major market shifts. Innovation will be borne by smaller, emerging vendors unlikely to be in it for the long haul.

While these two statements may seem contradictory, they are not. Working closely with a vendor does not mean abdicating long-term architectural responsibility. However, users must enter into strategic purchases with their eyes open. While it is possible to create architectures that give users relative independence at the hardware and operating system level, packaged applications and enterprise development tools create the greatest degree of user lock-in.

What strategies should IT users implement to maximize investments and reduce the risk of complexity?

Scope of IT Planning Opportunities

Source: Gartner Group

Applications and data have no value in and of themselves. Decisions must be made. Products, information and services must be exchanged. Money must be collected. Technologies will provide value to the enterprise when they enable tangible improved function. Classification of potential IT investments into three broad categories can simplify the analysis for selection. At the simplest level are the *utility projects* that represent functions which must be performed, but with little competitive advantage — such as asset management or expense reporting. An upgrade here must be justified by direct cost savings. *Enhancement projects* should actually change the competitive posture, such as in speed, service, lower cost, more productivity or adaptability. These must be measured by determining the value of the enhancement even if the numbers are not absolutely certain. The risk grows but so should the reward. The *frontier projects* may change the basis of competition or get the enterprise into new markets. They are naturally more rare and have the highest risk of all — sometimes becoming a byproduct of another effort.
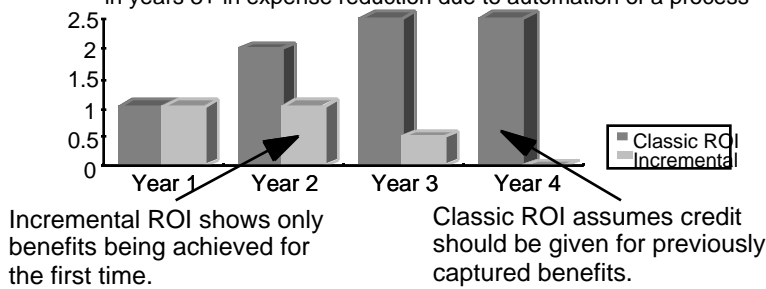
As IT spending increasingly becomes distributed, independent and hidden, investments in infrastructure and support become more critical, but harder to justify, pushing many organizations to noncompetitive levels of operation through 2000 (0.7 probability).

Sources of Strategic Benefits

Traditional Benefit Areas

- Cost savings or deferrals
- Time savings
- Reduced errors
- Greater accuracy
- Seamless operations
- Extended operations
- More efficient operations
- Better quality information
- Personal productivity

Strategic Benefit Areas

1. Raise customer satisfaction
2. Create profitable revenue and market growth
3. Increase product value and differentiation
4. Optimize operations and asset utilization
5. Raise people's business contribution
6. Improve management performance
7. Organizational effectiveness

A Sample Project:
Returns are $1 million in year 1; $2 million in year 2; $2.5 million in years 3+ in expense reduction due to automation of a process

Incremental ROI shows only benefits being achieved for the first time.

Classic ROI assumes credit should be given for previously captured benefits.

Source: Gartner Group

Key Issue: What strategies should IT users implement to maximize investments and reduce the risk of complexity?
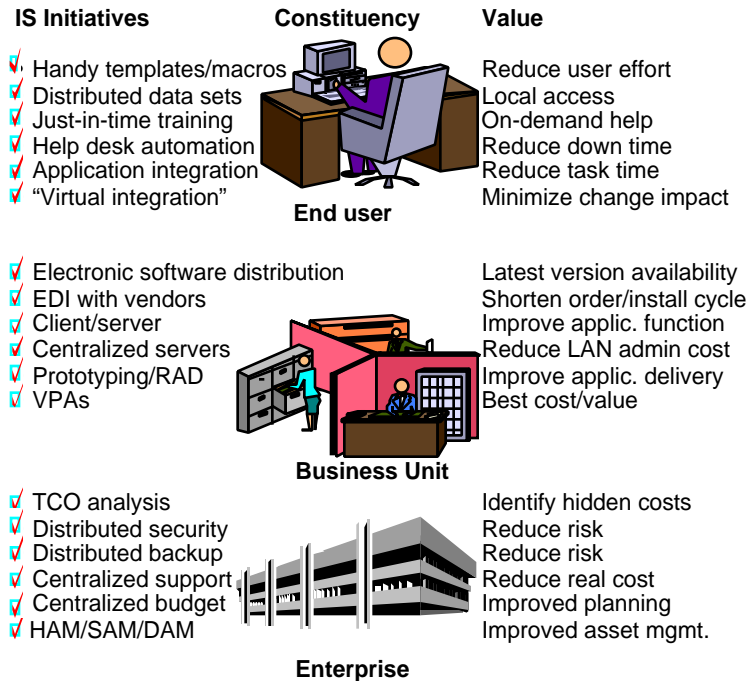
Type A companies will balance opportunistic and leading-edge technologies with solid support and infrastructure to reap competitive gains. Type C companies may simplify by buying or outsourcing. Many Type B companies will overspend in a constant struggle to remain competitive within their industries. Traditional measures of value have been built from the benefits delivered through application projects. However, even when these are converted to net new benefit forms, there is still difficulty turning them into measures that can be used to track value from IT. IT value is generally *indirect*. Especially going forward, IT creates capabilities that need to be leveraged through integration into the work process. Yet the IT base itself is not the value generator — it is what people do with it in support of business aims.

Benefits of *new* technologies can only be realized when applied to significantly new approaches to business direction. Over the next 10 years, we will witness the evolution of enterprises focusing on re-engineering efforts in marketing, product development and service issues to meet micro-market demands. Three components drive IT value generation: 1) business cycle needs, 2) good architecture, and 3) an IS organization tuned for value exploitation and delivery.

The value of any new "standard" must exceed the value of the product that is already in place, otherwise, efforts to impose IT standards will consistently fail.

IS Initiatives   **Constituency**   **Value**

☑ Handy templates/macros   Reduce user effort
☑ Distributed data sets   Local access
☑ Just-in-time training   On-demand help
☑ Help desk automation   Reduce down time
☑ Application integration   Reduce task time
☑ "Virtual integration"   Minimize change impact

End user

☑ Electronic software distribution   Latest version availability
☑ EDI with vendors   Shorten order/install cycle
☑ Client/server   Improve applic. function
☑ Centralized servers   Reduce LAN admin cost
☑ Prototyping/RAD   Improve applic. delivery
☑ VPAs   Best cost/value

Business Unit

☑ TCO analysis   Identify hidden costs
☑ Distributed security   Reduce risk
☑ Distributed backup   Reduce risk
☑ Centralized support   Reduce real cost
☑ Centralized budget   Improved planning
☑ HAM/SAM/DAM   Improved asset mgmt.

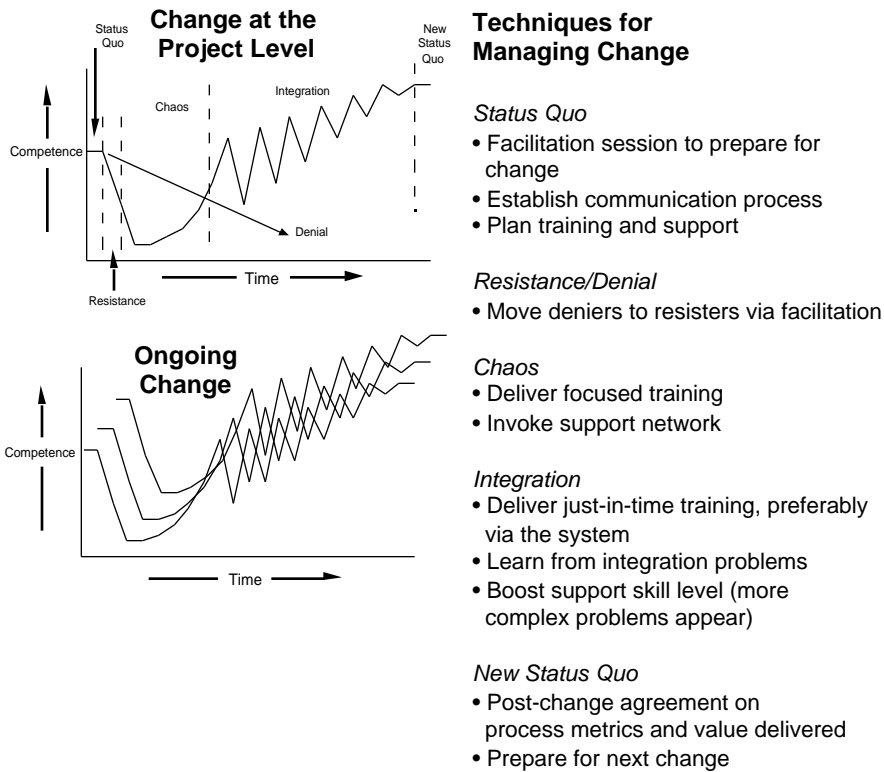**Enterprise**

Source: Gartner Group

Key Issue: What strategies should IT users implement to maximize investments and reduce the risk of complexity?

The value of standards is well understood. Standards improve interoperability, increase usability of systems and reduce support and administration costs. Standards are generally positive for end users, IS and the enterprise, as well as being on the critical path for more rigorous initiatives such as client/server, the deployment of custom-developed applications on PCs and distributed systems management initiatives. If standards are so important, why is there so much resistance to IS-sponsored initiatives, and why are standards so difficult to establish and maintain? The perceived value of standards is lower than the value of the in-place technology. The key is to add sufficient value to a technology portfolio to offset the pain of conversion to new products. The real goal is compliance, not standards. Users recognize value and must perceive a high value to be motivated to change. Value by definition is determined by the targeted constituency. IS organizations that have taken the value approach report more success — for example, 80 percent to 90 percent compliance in establishing desktop standards.

Managing change will be the No. 1 challenge for all organizations that are are striving for competitive flexibility in 2000 (0.8 probability).

Change at the Project Level

Status Quo

New Status Quo

Competence

Chaos

Integration

Denial

Resistance

Time

Ongoing Change

Competence

Time

Techniques for Managing Change

Status Quo
• Facilitation session to prepare for change
• Establish communication process
• Plan training and support

Resistance/Denial
• Move deniers to resisters via facilitation

Chaos
• Deliver focused training
• Invoke support network

Integration
• Deliver just-in-time training, preferably via the system
• Learn from integration problems
• Boost support skill level (more complex problems appear)

New Status Quo
• Post-change agreement on process metrics and value delivered
• Prepare for next change

Source: Gartner Group

Key Issue: What strategies should IT users implement to maximize investments and reduce the risk of complexity?

Change is the process of going from one comfortable position (status quo) to another. According to Virginia Satir's "Change Process Model," the six steps of change include: 1) status quo, 2) foreign element (the change event), 3) response (denial or rejection), 4) chaos, 5) integration, and 6) new status quo. Organizations seeking benefits from re-engineering must address each of these phases with the points above — at a minimum. Over the long term, as we move closer to the model of the dynamically engineerable organization, managing change on an ongoing basis will mean creating order out of continued chaos by striking a balance between the integration of old and new methods of conducting business.

IS organizations will increasingly utilize business process packages and outsourcers rather than build/customize solutions (0.7 probability).

Make vs. Buy

High		
	Outsource Customer/supplier	**Partner** Trust relationship Joint goals Interdependent Joint investments Shared risk
Cost		
	Contract Temporary Consultant Public services Purchased products/ services	**Build** Internal Skills transfer Hire/train
Low		
	Low	High

Strategic Value

Source: Gartner Group

Key Issue: What strategies should IT users implement to maximize investments and reduce the risk of complexity?

Today's use of outside resources — as with today's view of critical skills — is formed around a set of assumptions about how IS organizations deliver value. Few applications provide a specific "edge" that generates a sustainable enterprise competency. As a result, customized solutions will decline in importance.

Internal development will shift to infrastructure components: business objects that insulate and interface between the embedded package architecture and the enterprise's architecture, and that link external process outsourcers (e.g., payroll, travel reconciliation and interenterprise materials movements) with internal operations. Where applications are created for specific purposes, an increasing use of joint ventures to create "standard packages" will be undertaken. (Remember: CICS was once a single customer's internal creation.)

The restructuring of IS organizations' development resources, and their re-skilling, is the critical *internal* success factor for IS management in the next 12 to 24 months.

- A renewed emphasis on governance and strategy will replace the relative free-for-all of the last decade.

- IT planning and investment decisions will be continuous, collaborative efforts focused on value-based results during the late 1990s.

- Downsizing, ad hoc work teams and information as a source of competitive effectiveness will create demands for technologies to support mobility, group collaboration and large scale storage and intelligent retrieval of complex information.

- Security concerns will limit Internet applications through the planning period, but IT users should anticipate strategies as IT investments shift toward sales, marketing and customer responsiveness.

- There will be no master platform during the planning period. Small players will continue to proliferate, opening niches of value; those that gain market share will be acquired by the "name brands." IT users must adopt "disposable technology" strategies.

- IS organizations must be structured and trained to keep pace with change and to increase the value of IT to the enterprise.

- Applications and data have no value in and of themselves. Technologies will provide value to the enterprise when they enable tangible improved function.