underway to correct this. Benchmarking is often used to accomplish this task and consolidation may be a typical tactic (see Figure 12-5).

A typical question for IS organizations regarding these nonstrategic applications is whether to outsource them. This is often done, but consideration must be given to not lose necessary control of the infrastructure as a foundation for the enhancement and frontier opportunities.

For enhancement, the issue is not cost but finding the opportunities for better performance and ranking them based on business results, speed to implement and difficulty in copying the application. For frontier applications, the first question is: Does the IS organization have the desire and culture to take high-risk chances? Use of an advanced technology group may facilitate the decision-making process leading to these choices.

Key Issue Analysis: Based on the different issues relevant to each application category, the appropriate responsibility by management group can be defined as guidelines.

Another benefit of portfolio analysis is that it clarifies the roles and responsibilities of those whose jobs involve IT. Different essential tasks exist for each of the application categories and each plays a different role for the IS organization, the business unit customer and the senior corporate management. For utility, the key is reliability and cost, which is the primary job of the IS organization.

The business unit must verify the essential nature of the application and forecast its demand, and management must make sure cost measures are applied. For enhancement, the key task is to determine the relative payoff from a proposed application. The IS organization must determine the cost and timing, and management must verify that there is a good partnership between the IS organization and the business units. For frontier, the key task is leadership from senior management to pursue a vision and accept the risk. The business unit must be willing to innovate and the IS organization must consider the relative technical risk.

The Strategic Planning Assumption is:

- ***Scenario planning is a particularly useful technique to deal with unpredictable futures. Progressive companies will increase the use of scenario planning in IT through 2001 to aid in better decision making (0.7 probability).***

Some enterprises have used the concept of scenario planning for several years. The primary strength of scenario planning is to facilitate awareness and improve strategy in the face of high unpredictability. The idea is to create a small number of reasonable future scenarios.

Action Plan by Application Category

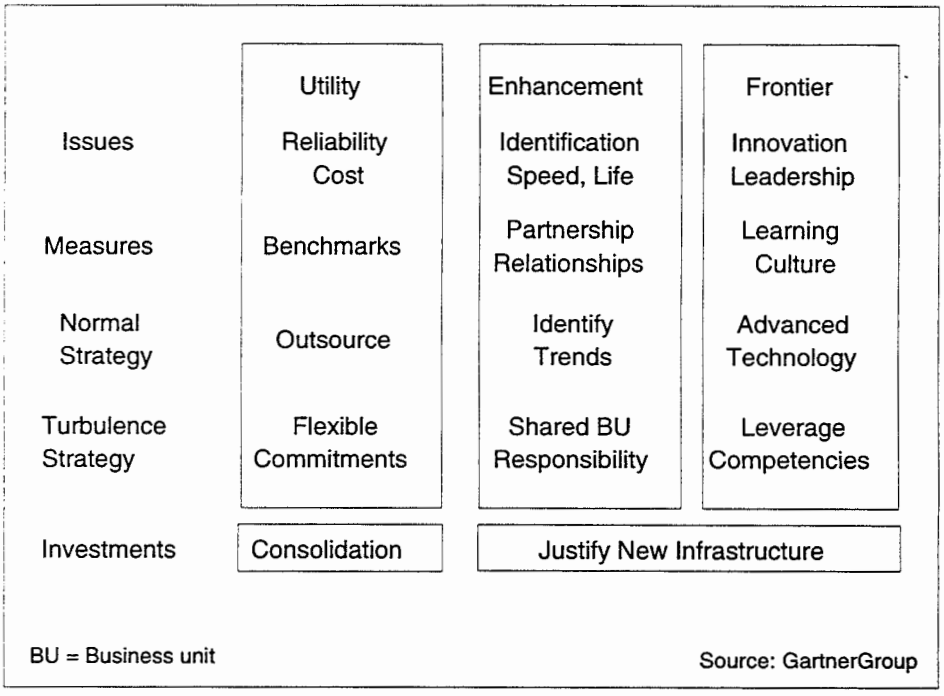


Figure 12-5

For each possible scenario, the enterprise should determine what the appropriate strategy should be if that scenario were to become reality. Some common strategies may be relevant for several scenarios. One scenario may also reveal a dangerous vulnerability if that scenario were to become fact. By considering all of these, the enterprise can select a better strategy vs. setting direction based on the one most probable scenario (see Figure 12-6).

For each scenario, the enterprise should identify certain events or flags that would indicate that the scenario is coming true. These should then be monitored to help determine what action the enterprise should take.

The corresponding Imperative is:

- ***To achieve IT effectiveness and gain the full participation of the IS organization, strong emphasis should be placed on business outcome measures, particularly for enhancement and frontier applications.***

Whether plans have been successful in their execution can best be determined by some means of measurement that demonstrates the results compared with what things were like prior to the new system. This applies to business applications as well as infrastructure investments. In either case, an effort must be made to capture the desired results with some form of measurement.

For the business applications, the IS organization and the business unit must agree on a common goal (e.g., to reduce the average time to enter an order by 50 percent with the new order entry system). It is important to know the starting point measures before any changes are made. Measurements can be multidimensional as well.

The concept of the balanced scorecard is growing. It deals with direct measures, such as money or time, and it considers the customer, other internal measures — such as errors or time performance — and the degree of learning or innovation involved. Any results should be widely available throughout the organization.

Business outcome measures are:

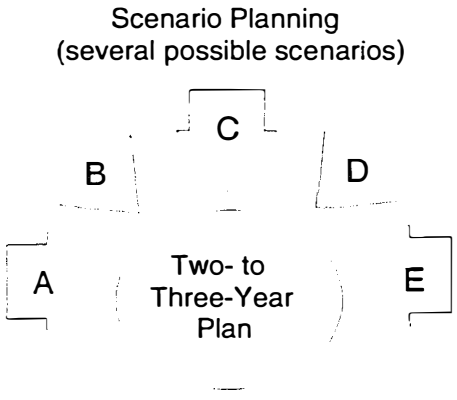
1. Create measurement parameters based on outcomes, whether business or infrastructure.

2. Establish baseline measurements at the outset, prior to any revisions.

3. Get joint agreement from business units and the IS organization on common goals for business applications.

Scenario Planning Under Uncertainty

Generate several possible scenarios
Review IT strategy for each one
Maximize probable payoff; minimize risk
Create and track events to reveal actual path



Source: GartnerGroup

Figure 12-6

4. Consider the balanced scorecard — financial, internal, customer and learning dimensions.

5. Communicate the outcome goals to everyone involved.

Key Issue Analysis: Based on IT-enabled capabilities such as information transfer (Internet) and knowledge management, dramatic business changes will occur that will challenge IS management. While luck and circumstances may be more important in a turbulent environment, adaptive planning can still play a powerful role.

Established trends are those that are clearly true and that must be accommodated. Confirmed trends are those that demand preparation by the enterprise within the next few years, depending on the aggressiveness of the enterprise's technology strategy. Projected trends are just emerging and are still somewhat speculative. They may have an important impact and should be considered now from a viewpoint of future planning or tracking (see Figure 12-7).

The pace of acceptance of these trends often remains uncertain. The Internet was essentially unheard of three years ago but now is a pervasive concern. Enterprises that pick up on the idea of knowledge management or business modeling may gain an advantage if they can make an early move.

12.5 Summary and Conclusions

- The realm of IT is often thought of as frustrating because of the difficulty users experience with poor quality, difficulty in use and rapid changes in technology, products and services. The vendor behavior that causes this is based on the extremely rapid price decline for IT capabilities. Better planning by the buyers cannot change this, but can help.

- Given the turbulence and unpredictability in IT, a better strategy for the IS organization should include flexible commitments, sharing responsibility with users and optimal use of IT competencies.

- The key measure under uncertainty is the IS organization's effectiveness or whether IT is used to achieve business objectives. Effectiveness depends on good planning.

- Planning under uncertainty requires shortening the planning horizon, reviewing continuously, not annually, and responding to situations as they arise.

- Portfolio analysis is a key tool for planning insight. This helps clarify the best way to manage and plan for the use of IT.

- Scenario planning is also a good tool to improve planning under uncertainty.

IT Trends With Major Business Implications

Established	**Client/server**
Being Confirmed	**Data warehousing and mining**
	Internet/intranet consequences
	— Fewer information brokers
	— Equalization of opportunity by size
	— Data access a prerequisite
	— Speedup in performance
	— Information anxiety (the glut)
Projected	**Knowledge management**
	Business process outsourcing via Interne
	— Templates and component assembly
	Practical business modeling tools

Source: GartnerGroup

Figure 12-7

- Measures of performance to evaluate planning success should be based on business outcomes.
- New IT trends that will require new planning attention include the Internet and knowledge management.

Glossary and Acronyms

ADSL (Asymmetric digital subscriber line)

ATM (Asynchronous Transfer Mode)
A wide-area network (WAN) technology, a transfer mode for switching and transmission that efficiently and flexibly organizes information into cells; it is asynchronous in the sense that the recurrence of cells depends on the required or instantaneous bit rate. Thus, empty cells do not go by when data is waiting. ATM's powerful flexibility lies in its ability to provide a high-capacity, low-latency switching fabric for all types of information, including data, video, image and voice, that is protocol-, speed- and distance-independent.

ATM supports fixed-length cells 53 bytes in length and virtual data circuits between 45 Mbps and 622 Mbps. Using statistical multiplexing, cells from many different sources are multiplexed onto a single physical circuit. The fixed-length fields in the cell, which include routing information used by the network, assure that faster processing speeds are enabled using simple hardware circuits. The greatest benefit of ATM is its ability to provide support for a wide range of communications services while providing transport independence from those services. An example is ATM's time independence; there is no relationship between the application clock and the network clock. Ironically, first implementations of ATM will augment local-area network transport (and then the WAN it was designed for).

BEST (Burst Error Satellite Transmission)

Bps (Bits Per Second)
A measurement used to calculate the speed of data transfer in a communications system.

BU (Business Unit)

CBT (Computer-based training)

CDMA (Code division multiple access)

CD-ROM (Compact Disc Read-Only Memory)
A version of the standard compact disc intended to store general-purpose digital data; provides 556-Mbyte user capacity at 10-13 corrected bit error rate compared to 635 Mbyte at 10-9 for the standard CD.

DB (Database)

DBMS (Database Management System)
A software package that enables end users or application programmers to share data. DBMSs are generally also responsible for data integrity, data access control and automated rollback/restart/recovery. A complete software facility for building, maintaining and generating reports from a database. It has evolved along three generic forms: 1) hierarchical DBMS (1960s) — records were organized in a pyramid-like structure, with each record linked to a parent; 2) network DBMS (1970s) — records could have many parents, with embedded pointers indicating the physical location of all related records in a file; and 3) relational DBMS (1980s) — records were conceptually held in tables, similar in concept to a spreadsheet. Relationships between the data entities were kept separate from the data itself. Data manipulation created new tables, called views.

DELA (Drexler European Licensee Association)

DES (Data Encryption Standard)
A security specification developed by IBM in 1977. Widely used today, it is available at no charge from many online bulletin boards and is based on a single key encryption algorithm. If user A wants to send an encrypted file to user B, user A would first encrypt it

with a private key (sometimes referred to as a "secret" key). User B would then decrypt the file with an identical private key. The concern with this encryption-only technique is key management. Recipients must prearrange for possession of the appropriate key for decryption to take place.

DS (Digital Signal Level 0, Level 1, etc.)

DS-1 (Digital Signal Level 1)

DVD (Digital versatile disc or digital videodisc)

ECAD (Error correction and detection)

EEPROM (Electrically erasable, programmable read-only memory)

EMV (Europay, MasterCard and Visa)

EPROM (Erasable programmable read-only memory)

EU (European Union)

Gbps (Gigabit)
One billion bits per second.

Gbyte (Gigabyte)
One billion bytes.

GSM Global System for Mobile Communications (formerly Groupe Speciale Mobile)

HCO (Healthcare organization)

HFC (Hybrid fiber coaxial cable)

HMD (Head-mounted display)

HTML (Hypertext Markup Language)

HTTP (Hypertext Transport Protocol)

IC (Integrated Circuit)

IDSL (ISDN digital subscriber line)

IEEE (Institute of Electrical and Electronics Engineers)
An organization of engineers, scientists and students involved in electrical, electronics and related fields. IEEE also functions as a publishing house and standards body.

IP (Internet Protocol)
TCP/IP protocol to track the address of nodes, route outgoing messages, and recognize incoming messages. Current networks consist of several protocols, including IP, IPX, DECnet, AppleTalk, OSI and LLC2. This wide diversity of protocols results from application suites that assume their own particular protocols. Collapse from this wide variety is inevitable, but users will only be able to reduce this diversity, not eliminate it. Most users will collapse networks into two main protocols: IP and IPX. Installed-base applications and the pain of change will prevent a total reduction to a single backbone protocol.

IR (Information retrieval)

IS (Information Systems)

ISDN (Integrated Services Digital Network)
As a technical standard and design philosophy for digital networks, ISDN provides high-speed, high-bandwidth channels to every subscriber on the network, achieving end-to-end digital functions with standard equipment interface devices. ISDN networks enable a variety of mixed digital transmission services to be accommodated at a single interface (including voice and circuit- and packet-switched data). Access channels under definition include basic (144 Kbps, or 2B+D) and primary (1.544 Mbps or 23B+D in North America, and 30B+D, or 2.048 Mbps in Europe) interface rates. Signaling System 7 (SS7), an out-of-band signaling scheme, is key to current ISDN implementation.

ISO (International Standards Organization)
A voluntary, nontreaty organization established in 1949 to promote international standards.

ISP (Internet service provider)

IT (Information Technology) Infrastructure
The underlying technological components that comprise an organization's systems architecture. The seven components of IT infrastructure are hardware, operating system, network, database, development environment, user interface and application.

Kb or Kbit (Kilobit)
One thousand bits.

KB or Kbyte (Kilobyte)
One thousand bytes.

Kbps (Kilobits per second)
A measure of data transmission rate — one thousand bits of information per second.

KBS (Knowledge-Based System)

KG (Kilogram)

KM (Knowledge management)

LAN (Local-Area Network)
A user-owned and user-operated data transmission facility connecting a number of communicating devices, e.g., computer, terminals, word processors, printers and mass storage units, within a single building or campus of buildings. Uses gateways or communications servers to connect with other hosts. Examples are Ethernet, AT&T's StarLAN and IBM's Token Ring Network.

LMDS (Local multipoint distribution system)

Mbits (Megabits)
One million bits.

Mbps (Megabits per second)

MIDI (Musical instrument digital interface)

MIT (Massachusetts Institute of Technology)

mm (millimeter)

MMDS (Multipoint Multichannel Distribution System)

MMX (Multimedia extensions)

MSP (Managed service provider)

MUDS (Multi-User Dungeons)

NC (Network computer)

NIC (Network Interface Card)
An attachment that connects a device to a network, similar to an adapter.

NOC (Network operations center)

NVE (Networked virtual environments)

OEM (Original Equipment Manufacturer)
Usually refers not to the manufacturer of a device, but to the system integrator that resells the device as part of a system. Sometimes used as a verb, as in "Company B is going to OEM Company A's drive," this means that Company A will manufacture the drive and Company B will integrate it into a system.

PC (Personal Computer)

PCMCIA (Personal Computer Memory Card International Association)
A nonprofit trade association founded in 1989 to standardize the PC card. PCMCIA cards are removable modules that can hold memory, fax/modems, radio transceivers, network adapters, solid state disks or hard disks.

PCMCIA cards are 85.6 mm long by 54 mm wide (3.37 inches x 2.126 inches) and use a 68-pin connec-

tor. The original Type I card is 3.3 mm thick and is now used for memory in personal digital assistants and other lightweight applications.

PCS (Personal communication system)

PDA (Personal Digital Assistant)
A pen-based, wireless transmitter that serves as an organizer, electronic book or note taker that features cellular service or desktop system.

PIN (Personal identification number)

POTS (Plain old telephone service)

RDBMS (Relational Database Management System)
A DBMS that incorporates the relational data model, normally including a Structured Query Language application programming interface. A database management system in which the database is organized and accessed according to the relationships between data items. In a relational database, relationships between data items are expressed by means of tables. Interdependencies among these tables are expressed by data values rather than by pointers. This allows a high degree of data independence.

RF (Radio Frequency)
RF refers to the electromagnetic frequencies used for radio communications.

ROM (Read-only memory)

RPC (Remote Procedure Call)
A mechanism that extends the notion of a local (i.e., contained in a single address space) procedure call to a distributed computing environment, enabling an application to be distributed among multiple systems in a way that is highly transparent to the application-level code. Examples of RPCs are Apollo's Network Computing System, Sun Microsystems Open Network Computing, Sybase's open client/open server and the Open Software Foundation's Distributed Computing Environment RPC.

RSA (Rivest-Shamir-Adelman)

SDN (Software-defined network)

SIOC (Society for Interchange of Optical Cards)

SQL (Structured Query Language)
A relational data language that provides a consistent, English keyword-oriented set of facilities for query, data definition, data manipulation and data control. It is a programmed interface to relational database management systems. IBM introduced SQL as the main external interface to its experimental relational DBMS, System R, which it developed in the 1970s. SQL statements include: data manipulation language statements: SELECT, INSERT, UPDATE and DELETE; data definition language statements, including the CREATE and DROP statements for tables and indices; statements that control data consistency, and grant and revoke authority. SQL statements are called dynamic when they are not completely specified until the program is executed. They are called static when they are completely specified when the program is compiled. SQL is precise, because it is based on predicate logic, but is difficult for average users to deal with, and its most fruitful position is as a protocol for software-to-software connectivity, rather than for human-to-software access.

TDMA (Time Division Multiple Access)
A frequency allocation technique based on allotting discrete time slots to users, permitting many simultaneous transmissions.

URL (Uniform resource locator)

VR (Virtual Reality)

VRML (Virtual Reality Modeling Language)

WTNI (WebTV Networks)

xDSL (Generic digital subscriber line encompassing ADSL and SDSL)