

CHAPTER



7



MAKING DAY-TO-DAY OPERATIONS WORK EFFECTIVELY, ALWAYS

Winners in business must learn to relish change with the same enthusiasm and energy that we have resisted it in the past.

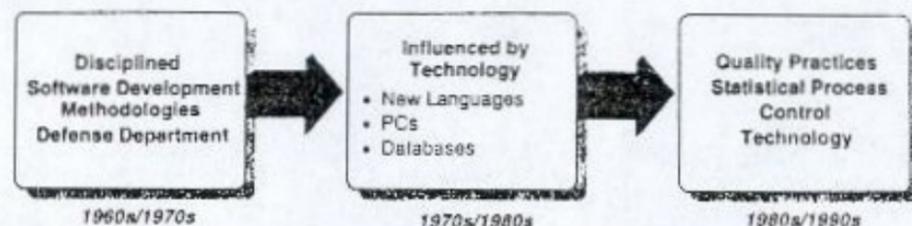
—Tom Peters

This chapter explores how well-run I/T organizations approach daily operations, particularly in regard to data centers and then explores the power of measurements as a way of understanding thoroughly how effectively these responsibilities are carried out.

Daily operations are the major activity of any I/T organization. It is the stuff of which legacy systems are made. But making changes to applications, swapping in new hardware for old, and writing new applications are what I/T organizations do. It all has a project management quality about it. For that reason it should come as no surprise that project management was the first I/T function to undergo significant changes, becoming in most departments the most mature and robust of all I/T processes. This was especially the case in well-managed I/T operations, no matter what decade you pick. It is the one that frequently experienced the latest thinking about project control and was one of the first areas to be influenced by process management thinking in the 1970s and 1980s. As Figure 7.1 suggests, in the 1960s

and 1970s many of the disciplined work habits of the U.S. Defense Department and those of the software development community seeped into most I/T organizations, regardless of how effective these departments were. In the 1970s and 1980s the introduction of many new tools, including hundreds of new programming languages, database management tools, and personal computers were added to the repertoire of project management. In the 1980s and 1990s more technology, but most important, the introduction of statistical quality control practices and quality management, added more influences to the process, reinforcing I/T mind-sets that life is a series of projects.

FIGURE 7.1



In the case of applications, these I/T organizations learned that it was especially important to practice rigorous project management with large applications. As Figure 7.2 illustrates, project management practices are valuable in every phase of an application life cycle, particularly in conducting analysis, design, and testing. The operations side of the organization, however, also applies the same techniques for operating and evaluating these applications. The difference between the run-of-the-mill I/T organization and world-class operations is not that they use these techniques, but rather how well they deploy them.

Best Practices in Project Management

Seven major software quality components are invariably the focal point in well-run operations. Figure 7.3 lists widely evident components in these organizations. As a group they address basic business issues: efficiencies, effectiveness, end-user concerns, containment of risk, and exploitation of technology. The components match very neatly with similar concerns evident in manufacturing, engineering, and a wide variety of I/T activities: daily operations, systems design and implementation, application coding,

FIGURE 7.2

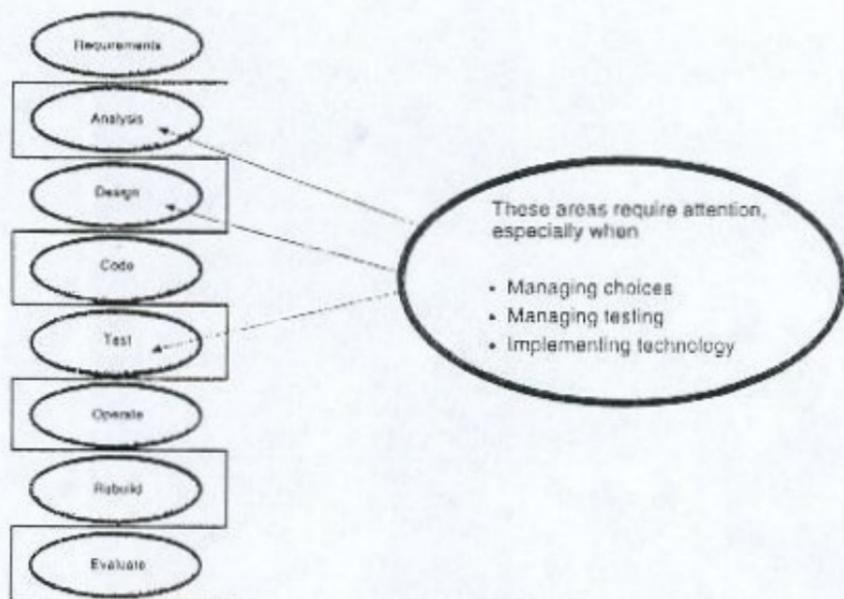


FIGURE 7.3

<i>Component</i>	<i>Definition</i>	<i>Importance</i>
Flexibility	Continuous evolution and changing needs	Response to users
Maintainability	Quick repair and replacement	Improves customer service
Reusability	Optimal productivity and quality of software	Lowers development cost
Integration	Coupling one product to another	• Easier to use applications and get access to data
Consistency	Ease of learning and use	• Reduces training needs
Usability	Optimal user productivity	• Exploits power of applications and reduces user technical training interface
Reliability	Optimal system productivity	• Supports end-user processes

benchmarking, and outsourcing of functions to mention a few. Most data centers have lists similar to Figure 7.3; the best constantly refer back to them and try to have a list that is applicable across the entire organization.

The top I/T organizations around the world have taken the extra step of aligning their project management practices with those of the rest of the enterprise because they have to work with other parts of the company that may have different project management philosophies and techniques. Outstanding organizations have even gone so far as to lay out on paper the interactions that are now familiar across functional departments. Figure 7.4 provides a conceptual construct of how that looks. The two boxes with the heavy borders, for example, come back to our arguments in Chapter 2 about the need to link business and I/T architectures. The same thing occurs in linking what computing people want to invest in and I/T's responsibility to find out what technologies there are to invest in. Project phasing, systems organization planning, and management controls work very well across organizations, providing the language and scope are similar and agreed to, in other words, another form of linkage.

Any crusty technical manager will tell you that most project management methodologies are very similar, almost a management commodity. What they must do, however, is focus attention on delivering services. Project management methodologies over the past decade have continued to evolve, acquiring a more customer/end-user focus. We can see that focus demonstrated, for example, in IBM's own findings about what some of the best practices are in how services are delivered. A close look at Figure 7.5, for example, shows that resource commitments, actual performance of work, delivery, and then maintenance are not independent, discrete events. Rather, the I/T community has worked hard to integrate these various functions. Poorly run organizations know that they have all these tasks to perform and treat them independently of each other; the best do the exact opposite; they link them together tightly.

Listen to what your end users have to say about project management as well. *Computerworld* conducted a customer satisfaction survey of the 25 largest systems integrators, firms that routinely manage large projects. What they learned is just as applicable to what organizations do well or poorly when they manage projects internally. When asked what their most important criticisms of large integration projects were, end users said inflexibility of the project management methodologies, inadequate training of end users, and never-ending expansion of the project scope published (February 26, 1996).

FIGURE 7.4

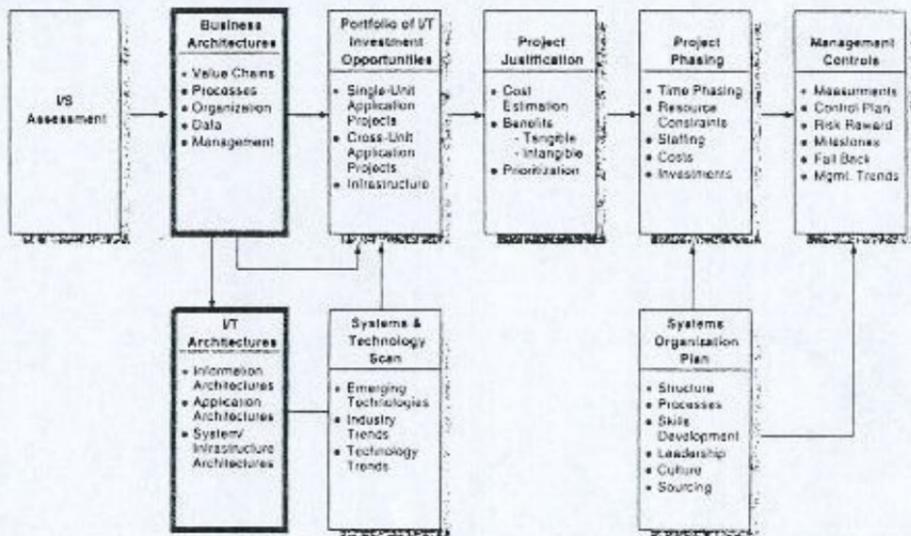
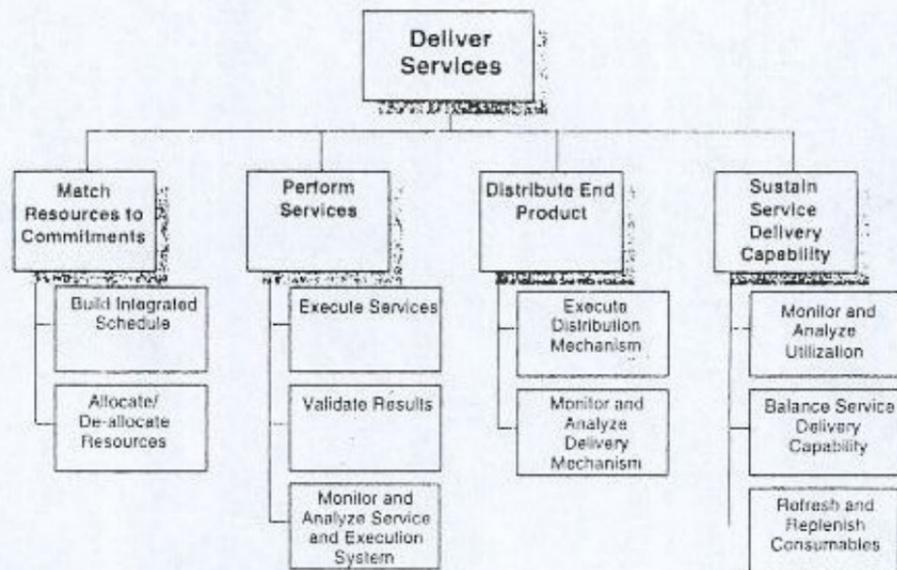


FIGURE 7.5



The Changing Data Center

The heart of most I/T organizations is the data center—the glass house—the place where the computer resides. We all know what the place looks like: raised floors, lots of air conditioning, security cameras, locked doors, everyone walking around with identification badges conspicuously displayed; the place looks almost like a hospital. Even in small companies that rely on networked PCs, you find clusters of hardware together. In very large companies you may see one or two dozen data centers each with hundreds of employees and millions of dollars invested in hardware and software. For many companies in numerous industries this is about as close to the heart of the business as you can get physically.

Data centers are primarily responsible for the actual delivery of day-to-day services. They keep the networks and computers going so you and I can log onto a terminal and do our work. They operate the Help Desks and the telephone hot lines you and I call when we have problems. They buy equipment and software. They maintain databases and often perform software maintenance on legacy systems. They are the information factory of the company, spewing out paychecks, reports, and data on-line. To a large extent, they are run like manufacturing sites. What has become very evident during the 1990s is that data center operations are adopting formal process-based approaches, just as factories did. And like their manufacturing counterparts, they were drawn to the same issues: efficient automation, quality management practices, just-in-time strategies, and cycle time reduction.

Part of that discipline has been for managers in data centers to define clearly their role versus those of other I/T departments and end users. The hallmark of well-run organizations is that they have taken the time to set expectations within I/T and with their customers. Service-level agreements are quite common, joint reviews of performance, customer surveys, and documented reviews are everywhere. Data centers post their performance on their walls and send copies to end users. Companies like IBM, Appleton Paper, and Motorola, to mention a few, use sophisticated measurement processes to track a wide variety of performance characteristics which they then broadcast to their stakeholders. Figure 7.6 illustrates a best practices type of communication that appears in many organizations with only slight variations. Real-world examples also contain many more names and telephone numbers and are published on paper and exist in databases accessible by end users.

FIGURE 7.6

Your Task	Our Responsibility	Who Helps You	Measures of Success
<ul style="list-style-type: none"> Tell us your needs 	<ul style="list-style-type: none"> Understand Apply 	<ul style="list-style-type: none"> Project managers 	<ul style="list-style-type: none"> Project assessment Project acceptance
<ul style="list-style-type: none"> Tell us your problems 	<ul style="list-style-type: none"> To fix To improve service 	<ul style="list-style-type: none"> Help Desk (1-800-777-1521) All I/T employees 	<ul style="list-style-type: none"> Process measures Help Desk measures End-user survey
<ul style="list-style-type: none"> Include I/T in your strategic planning 	<ul style="list-style-type: none"> Participate Describe how I/T can contribute 	<ul style="list-style-type: none"> Appropriate experts Team leaders 	<ul style="list-style-type: none"> Your opinions Your ability to make your targets Corporate measures

The number of processes required to run a data center is staggering (see Figure 7.7). IBM's own count is 35 megaprocesses clustered around eight groups of activities. The documentation accumulated over the past 20 years on these processes far exceeds the amount of material on all other processes in I/T. Of all the sets of processes in any I/T organization, these are perhaps the most widely implemented. Put another way, even the worst I/T shop views most of its data center operations as collections of processes and have good, fact-based appreciation for the quality of its performance. I call this point to your attention, however, to reinforce that this is where many information processing professionals live. Best practices companies work very hard to make sure these employees don't forget all the issues discussed in the previous five chapters.

Buying I/T Equipment and Software: The BuyIT Campaign

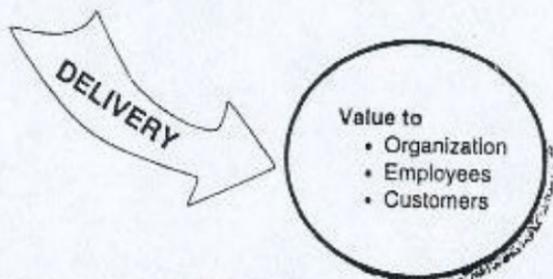
For many I/T organizations the acquisition of I/T is expensive and the way decisions are made to acquire is risky. The BuyIT campaign is a campaign decision to promote and facilitate best practices in the acquisition of technology. Purchasers and vendors of I/T in the United Kingdom are joining together to develop a best practice in this area.

For more information, see "BuyIT: Taking the Risk Out of IT Procurement," *Purchasing and Supply Management* (February 1995): 4-5.

FIGURE 7.7

8 FAMILIES OF I/T PROCESSES

- Satisfying customer relationships
- Defining enterprise I/T management practices
- Managing I/T value to the organization
- Realizing solutions
- Deploying solutions
- Delivering services
- Supporting I/T service & solutions
- Managing I/T assets and infrastructure



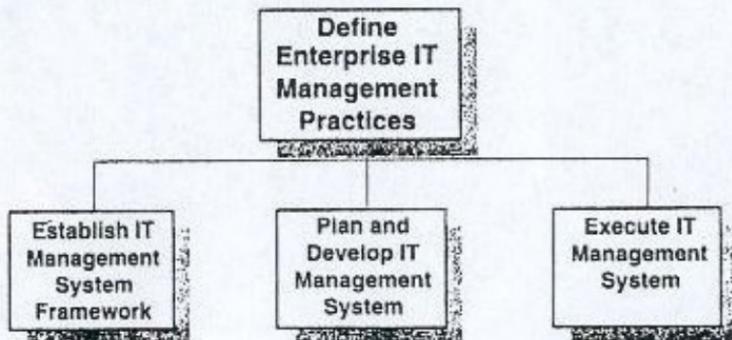
Does this mean there is nothing unique about well-run data center operations? In fact, one of the most important developments of the late 1980s and early 1990s has been the creation of formal processes to maintain I/T management practices (see Figure 7.8).

There are essentially three basic tasks involved:

- Establishing an I/T management systems framework
- Planning and developing the I/T management system
- Executing the I/T management system

The first one involves identifying those variables and guiding principles essential to I/T, laying out a management framework for how I/T will make decisions and judge performance. Typically it is at this point when management decides how baselines and desired frameworks are to be defined and a strategy for communicating across the organization. Planning and developing a management framework takes you to the next step by actually developing such things as the key measures of performance (e.g., departmental report cards), creation of the management model, and documented statements about roles and responsibilities. Execution involves reviewing and analyzing key performance indicators, identifying and changing management practices, and assessing how the organization as a whole works together.

FIGURE 7.8

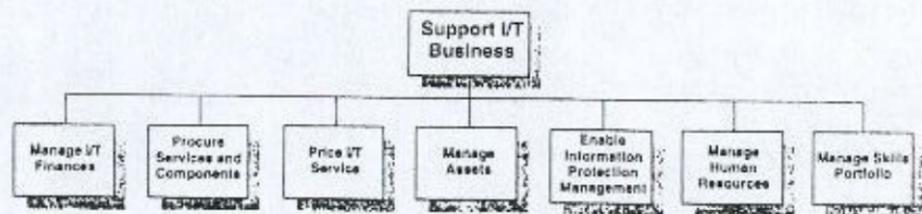


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So far in this book, we have jointly looked at what people do well. There is one area that most everyone seems to be struggling with, namely the management of I/T assets and infrastructure as a *whole*. The reasons are not completely clear. But first, let us understand what the tasks to be performed are (see Figure 7.9). First, there is the budget; second, buying hardware and software; third, pricing I/T services to customers and end users; fourth, managing assets like hardware in the data center, on order, and in the warehouse; fifth, providing data and physical security; sixth, all the people management issues; and seventh, managing the portfolio of skills. In many cases tasks are being done well, such as training and implementing human resource plans. But the rest is spotty.

The problem can be largely traced to a wide variety of activities that need to be performed. I think most readers understand good and bad budget management practices. But these are also linked to acquisition of equipment and services. If PC vendors keep lowering the cost of computing by close to 20 percent a year, how do you take advantage of that both in terms of prices paid and how you depreciate the equipment? If yours is the kind of organization that charges expenses back to end users—and well-run shops both do and do not do this—what effects do your charges have on encouraging or discouraging use of computers? Managing software licenses is currently also a nightmare for all I/T organizations. So is keeping track of all the hardware. Walk around your company or agency and you will see discarded PCs, old printers, and unopened outdated software in closets; go to the company

FIGURE 7.9



warehouse and you will see more hardware piled up in corners. In the data center there is always the debate of when to swap out installed equipment for newer devices. And so the problems go on and on.

One best practice that is beginning to emerge is to outsource desktop technology, their networks, and overall management and support to an organization that does this for a living. Under such an arrangement, you could also contract with such a company to refresh your desktop technology from time to time in an organized way. The key is to outsource to a company whose core competency and support infrastructure is desktop technology and its associated management practices. The rationale is that this is a huge area of responsibility for any normal I/T organization and a monster for a large corporation that might have 10,000, 30,000 or even 100,000 desktop devices installed. Do you want to manage something like that, especially if it is not a core competence of yours or even a strategic part of what you do for a business?

For any individual issue just listed, there is a body of best practices in print. Many of them were the subject of my previous book *TQM for Information Systems Management* and some of my earlier publications. We have known about these things for a long time. Practicing them remains a challenge, even though well-run organizations are now attempting to lash these specific asset and resource deployment practices together. There are several good reasons for this. For one thing, about a third of a company's I/T bill is spent on the acquisition and disposal of hardware, software, and related services (such as hardware maintenance). Just managing those three sets of assets more effectively can save a lot of money. But linking replacement of hardware with newer devices means you have to make sure your training plans take that into account.

Planning for asset swaps has to be carefully done if you are to install quickly and thus take advantage of this equipment. Budget management is

difficult because it is linked with corporatwide budgeting processes and at a time when there are fundamental changes that bode well for I/T. For example, many companies are expressing strong interest in applying ABC accounting to various functions; that requires looking at budget data in new and different ways. A piece of them always seems to include I/T. If you are pro-ABC, you immediately subscribe to the notion that lashing asset management together is a good idea; if you are not a fan of ABC, you still have to understand what value hardware, software, and services renders the corporation. Regardless of your accounting practices, the best always make the link between I/T expenditures and increased value delivered to the business. Benchmarks of state-of-the-art data centers demonstrate that they have great capacity and leading-edge capabilities and are also rated high on cost/millions of instructions per seconds (MIPs) and other technical measures but have done a poor job in teaching programmers how to utilize effectively such software tools as database managers, consequently driving costs of applications too high. In some data centers with this problem, the centers were great while the organization's ability to utilize these were poor. So are dollars well spent in this environment? The point is, to implement best practices, you must ask, for example, what value does a computer upgrade return to the business?

How Hardware Is Selected Today: The Decision Criteria

An IBM survey in 1995 looked at the process by which companies selected what hardware to acquire. Done in context with understanding the role of strategic applications of I/T, researchers noted that the key selection criteria were most frequently reliability, performance, compatibility with existing installed technology in the organization, adaptability to changing application needs, and conformity to "open" standards. Cost and vendor support remained high on the list but not to the extent they were a decade ago. Respondents to a survey said that today and for the next five years, the decision about what technologies to acquire would largely remain centralized. Only a third had distributed or anticipated distributing the acquisition decisions to the business units. The larger the company, the more centralized the architecture and technology acquisition decisions became. Companies with I/T strategies most frequently centralized key strategic acquisition decisions.

For further information, see Kevin Burden, "Reputation, Price Catch User's Eyes," *Computerworld* 29, no. 46 (November 13, 1995): 126.

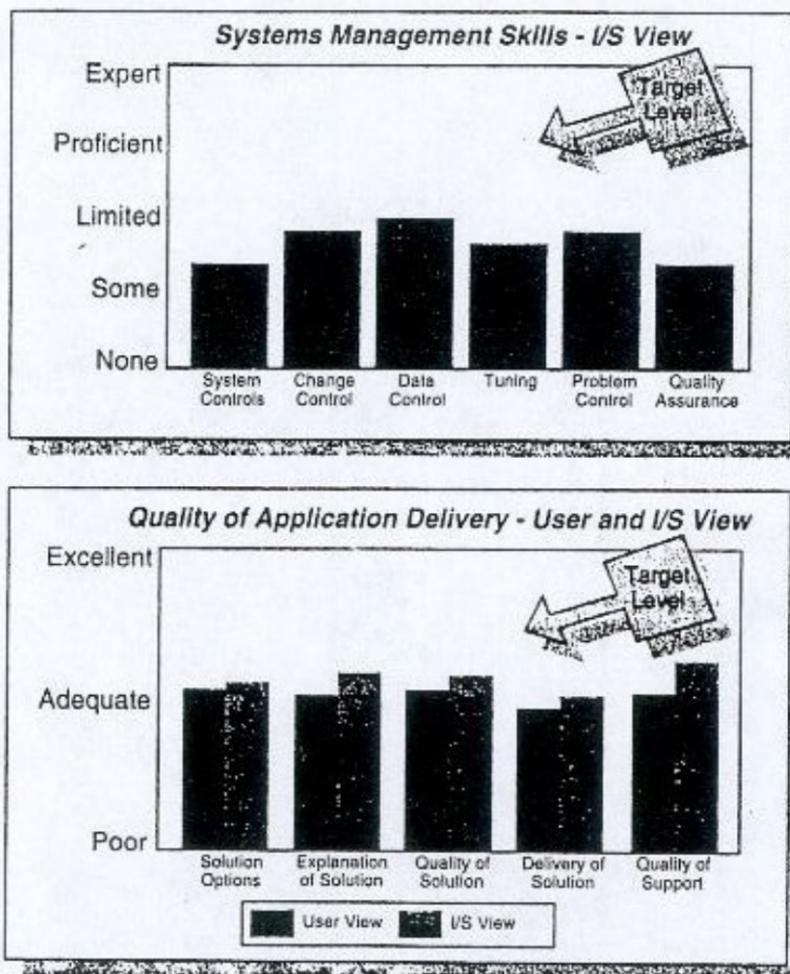
The Power of Measurements

One of the most obvious developments to occur in well-run I/T organizations is the revolutionary changes made in measurements. Many of the problems just discussed, for example, concern measurements: accounting for how things happen and cost. There are a great deal of exciting new best practices emerging in well-run I/T departments. To make a long story short, customer focus has come to I/T measurements. Looking at performance from the point of view of the end user is having a renaissance unlike anything we have seen since the 1960s. As management practices have changed, so too has the need for different measures. Process management styles now call for process measurements. Value-add activities require measures of value, and so forth. Measurements are becoming more comprehensive and not limited to speed of equipment, amount of uptime for hardware and software, or expenditures versus budgets.

Perhaps the most obvious best practice evident today is a fundamental shift from looking at performance by internal criteria to viewing them from the point of view of end-user communities. As Figure 7.10 demonstrates, asking different questions yields new answers. In this case, the Information Systems (I/S) organization looked at skill levels from its perspective. In the second chart, end users were asked, along with I/S to compare the quality of application delivery. End users were not as generous in their assessment as were I/S professionals. Well-run I/T organizations look at the end-user assessments quite seriously, want to know what their people think to see how realistic their views are but then take action primarily motivated by end-user perspectives.

A second pattern currently evident is the attempt being made by I/T executives to close the gaps between what they know and what they need to know from measures. For example, they are now developing measurements that document the degree of cultural change in their organizations, defining rates of progress. Figure 7.11 (p. 152) is a sampling of some of the new measurements being implemented. Executives are becoming students of measurement processes, a relatively new field, an outgrowth of quality management operating strategies. The most advanced are now trying to understand the relationship and effects of one measure on another. Executives outside and above the I/T department are increasingly focusing on customer satisfaction data and such business measures as I/T dollars spent

FIGURE 7.10



as percent of revenue or number of I/T projects aligned to corporate strategy. The measures in Figure 7.11 thus become second-tier indicators of operational effectiveness within the I/T organization. My own research, and that of others, is leading to a better understanding of the relationship between various types of measurements. Figure 7.12, which I explain in greater detail in the companion volume to this book, defines nine types of measures and which ones influence each other. This is the way you read it. Waste affects the speed (cycle time) with which an organization can per-

form. The speed at which you perform makes it possible or not possible for you to be more flexible in responding to changes in market conditions and customer needs. Flexibility influences productivity and customer satisfaction. Customer satisfaction will affect the amount of business growth you can enjoy and what happens with your vision.

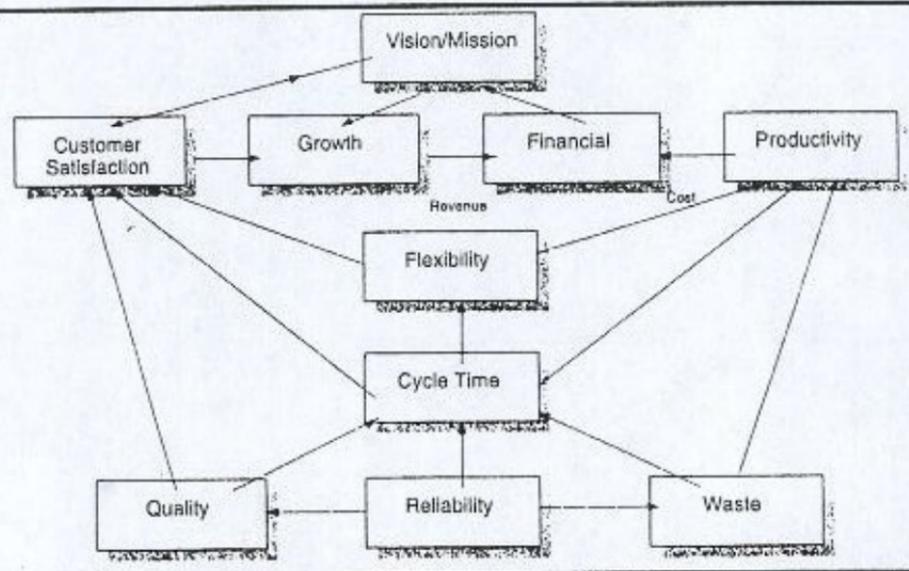
The bottom line, however, for I/T organizations, is that they are adopting a wider collection of measurements than they have used in earlier years. Departmentwide report cards are particularly popular. They are typically published monthly, are posted on bulletin boards, and mailed to end users. Figure 7.13 (p. 154) is a sample of such a report card.

The best begin with measures that link the performance of the I/T department to corporate goals both through the actual measures and a clearly communicated explanation of how those measures demonstrate progress toward contributing to the success of the business as a whole. The best organizations always use corporate goals to drive I/T measures.

FIGURE 7.11

Type	Format	Why
Size (# of Lines, Modules)	Numbers	Size Drives Cost
# / Type of Defects	Sigma (Errors per Million)	Quality of Software, Performance of Developers
Error Density (Pages/Hour)	Logarithmic Chart	To Understand Quality of Review
Resource/Plan Expended	Bar Graphs	To Understand How Effective is Planned Application of Resource
Customer Feedback	Bar Graphs, Pie Charts	To Understand Types to Eliminate
Review Rate	Bar Graphs	To Understand Quality of Review Process, Speed of Work
Ranges of Errors	Control Charts	To Understand Pressure on Workers to Speed Up Production
Inspection Errors, Intensity	Logarithmic Chart	To Understand Effect of Speed on Workers, Quality of Work
Customer Detected Defects	# and Type Bar Graphs	Quality, Level of Customer Satisfaction
Production Failures	# Control Chart	To Develop Predictability
Application Size at Time of Delivery	Lines of Code or Modules	To Improve Project Predictability
Development Costs/Time	Table, Trend Charts	To Improve Predictability of Costs and Effort
Trouble Spot Density	Control Charts/Bar Graphs Scatter Diagrams	Project Control

FIGURE 7.12



Conclusions

The key best practices in running day-to-day operations involve the implementation of formal project and process management techniques for daily operations. These techniques are heavily end-user/customer focused and are linked to corporate business objectives. Measurements are broadening to take into account the new types of information operations managers and their stakeholders' needs.

This area remains the most difficult part of I/T to innovate in because of the broad scope of activities involved. Operations is also the one area that first of all adopted many of the practices now seeping out into other parts of I/T and the corporation as a whole. Such practices as procedures documentation, performance standards, and benchmarking have long been hallmarks of how most operations functioned. Their techniques are the ones being adopted by others. Thus operations managers, in order to innovate from their point of view, often go beyond what everyone else is appearing to be adopting for the first time. However, the net result is that by linking closer to the needs of customers, end users, and colleagues in the department (e.g., programmers) and to the corporate business plan, these departments are becoming more visible. They

FIGURE 7.13

Customer Satisfaction	- Index %
Quality	- Baldrige Points
People	- Opinion Survey
Revenue & Market Share	- Money & %
Financial Performance	- Number & %
Corporate Goals	
IS Measures	
Programming Related Incident Reports	- IRs
Cost of Service/End-User	- Money
Cost per MIPS	- Money
Gigabytes per MIPS	- Ratio
MIPS per Data Center Headcount	- Number
MIPS per Systems Support Programmer	- MIPS
End-User Satisfaction Surveys (Performance, Timeliness, Attitude, Communication)	- Percents
Trends in End-User Satisfaction	- Percents/Time
Skills Training	- Average Hours/Employee
Baldrige Assessment	- Points
Time Spent on Quality	- % of IS Div's Hours
Suggestions	- % Implemented
Abandoned Call Report	- % of Sigma
Problems Resolved	- % of Sigma
Response Time Meeting Targets	- % of Sigma
Network Response Time Meeting Targets	- % of Sigma
DASD Growth	- % Y-T-Y
Total Defects by Group	- Number/Week
Availability by Systems	- Minutes Downtime

are also being seen by end users and customers as being more responsive, a clear example of the role of end-user and customer perceptions about value delivered that we discussed in Chapter 3. Surveys of end users and customers also suggest that the better support increases business management's support of information systems, user satisfaction, and ultimately their job satisfaction in general.

Our next chapter folds in many recent developments of a general management nature because in our continuing quest to align I/T with the rest of the corporation, practices in management are essential. For that reason, we will review the role of quality management practices, changing corporate cultures, and even what we still don't know because we must not think that I/T is the silver bullet, the black magic of the late twentieth century. I/T organizations are populated with people just like those in the rest of the enterprise, so we need to appreciate what works in creating a culture that hunts for value.

What's the Best Way to Measure Software?

For two decades now there has been a significant debate about how best to measure the productivity and effectiveness of software development, maintenance, and use. Popular measurement systems have included Factor Criteria Metrics (FCM), Quality Function Deployment (QFD), Constructive Quality Model (COQQAMO), Goal Question Metric methods (GQM), Application of Measurement in Industry (AMI), and a wide variety of maturity-based techniques. Evidence suggests that AMI is one of the most flexible but that GQM may be the best measurements practice because it produces consistently high ratings from users. AMI does not have a terrific track record but it is one of the most popular approaches so far. The most mature measurement processes are FCM, QFD, and COQQAMO. The big move in many of these systems is incorporation of process measurements.

For more information, see John Roche and Mike Jackson, "Software Measurement Methods: Recipes for Success?" *Information and Software Technology* 36, no. 3 (March 1994): 173-189.

Implementing Best Practices Now

Action	Why
Outsource those portions of data center operations which are stable or can be done better/cheaper by someone else.	Because you want your I/T organization focusing its resources and energy on making the company more competitive.
Link day-to-day I/T operations to day-to-day activities of the company through use of review boards and end-user surveys.	This will help ensure that I/T operations remain "end-user" focused and responsive.
Benchmark stable operations regularly.	So you can be as efficient as is humanly possible.
Implement a broad range of measurements that are results oriented and tie back to corporate business objectives.	Focuses on "where's the beef?" and not just on fluff and "going through the motions."

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