THE AT&T QUALITY SYSTEM

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AT&T has changed. Principally because of the breakup of the Bell System, rapidly advancing technology, and increasing competition, AT&T is a far different enterprise than it was just three years ago. No longer is AT&T primarily an American telephone company. It is, rather, a global information management and movement company. As AT&T's mission and markets have changed, the focus on quality has changed as well. Today, quality has a new, strategic role at AT&T, and this renewed focus on quality will be a key to customer satisfaction—and a key to AT&T's profitability in its new environment. This article discusses the crucial role quality plays in AT&T's postdivestiture strategy and describes the structure and implementation of several company-wide quality-management efforts, including the development of the Integrated Quality System, a process conceived to ensure that AT&T's commitment to quality for all its products and services will be met.

AT&T's New World

Today's AT&T faces a global business marketplace, and that demands a reassessment and redefinition of its mission and resources, as well as the basis upon which it competes. The push into the global market of telecommunications and information management affirms several facts of business life that were not determining factors for AT&T in its predivestiture environment. Today, AT&T

- Has facilities and alliances around the world.
- Serves a wide variety of markets with many products and services, from network equipment and long distance communications services to computing equipment, telephones, and electronic components.

- Faces fierce competition from large, well-financed, technologically capable, international companies in every market it serves.
- Depends for its profitability on its ability to deliver attractive products and services to its customers at the lowest possible cost.
- Faces continual pressure to reduce the time and resources required to realize a product—a fact that means limited windows for new product introduction, and limited opportunities to win customers.

These dramatic changes have an equally heavy impact on quality at AT&T, the definition of it, the methods for achieving it, and our awareness of its bottom-line impact in a competitive, high-tech world.

Broad New Focus on Quality

As AT&T's mission and markets have changed, the focus on quality has changed as well: from a definition that was internally focused to one that is customer-focused; from efforts that were inventory- and inspection-intensive to those that are planning-, design-, and process-intensive; from a reliance on quality inspectors to a reliance on everyone in the business.

Today, in short, quality has a new strategic role at AT&T. This renewed, refocused emphasis on quality can

- Differentiate our products and services in the marketplace, as it strengthens an already existing strong image.
- Accelerate product introduction, as the philosophy of "doing the job right the first time" pervades the enterprise.
- Control costs, as a new stress on process quality eliminates or reduces scrap, rework, inventory, multiple order-processing, repair, warranty, and service costs.
- Involve our employees in the business, as managers solicit and act on the input of all employees in improving the quality of products and services.

Quality provides a crucial link uniting the interests of both client and company, benefiting and satisfying both parties in an ever-widening and demanding global marketplace.

The Customer Is the Boss

The new focus on quality must begin with the customer (or potential customer): with finding out—by asking—what the customer wants; with defining quality in the customer's terms.

As Harvard Business School professor and AT&T consultant David Garvin points out, "Quality is not what the Marketing Department says it is; it's not what the Engineering Department says it is; and it's not what the Manufacturing Department says it is. It's what the customer tells you it is."[1]

Garvin lists eight components or dimensions that customers use to describe product or service quality (see the panel on page 24). For success in the marketplace, Garvin points out, a business need not satisfy to the highest degree all eight dimensions of quality in its products or services. Instead, the challenge to business is to identify those dimensions that are important to those customers it wants to win or keep—and then to design products or services that meet those dimensions.

Garvin's approach means continuous attention to customer needs, through market research, focus groups, surveys of various kinds, and face-to-face contact between the business and the customer.

If a strategic emphasis on quality begins with the customer, it also ends with the customer. Total customer satisfaction must be the ultimate measure of a quality product or service. Does it do what was promised—the first time, and every time thereafter? Are delivery and documentation satisfactory? Will it bring the customer back to do business with you again?

An Integrated Quality System

Between beginning and ending with the customer, AT&T's new emphasis on quality must extend to every step in the Product Realization Process. Figure 1 illustrates that process. Each box represents a specific step in the process, one usually performed by a separate organization within the company.

There is, however, considerable overlap between successive steps in the overall process—an indication of

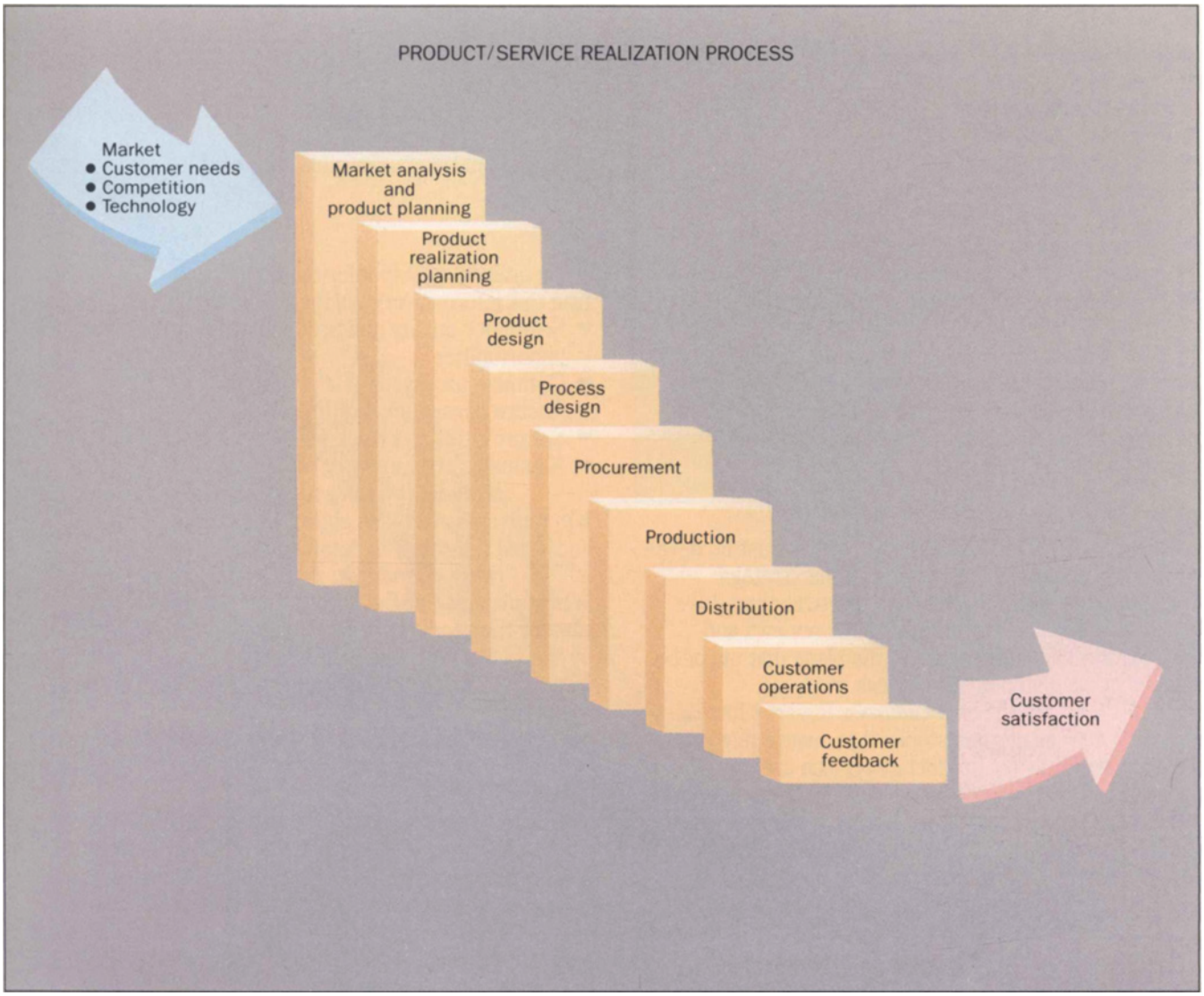

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Figure 1. The Product Realization Process. The market forces of customer needs, competition, and technology are the inputs to the process.

how the Product Realization Process is accelerated and compressed in a competitive environment. Also, between each two steps, information or material is transferred from one internal organization to another. Maintaining quality at these transfer points is critical to the overall quality process and extremely dependent on these transfers.

To improve quality in all its products and services, a dedicated group of quality planners at AT&T's Corporate Quality Planning organization, AT&T Bell Laboratories Quality Assurance Center, and lines of business (LOBs) are now working to develop and implement an Integrated Quality System (IQS) across the entire Product Realization Process for every product or service the company offers. Figure 2 shows the six principal elements of the Integrated Quality System, divided into LOB functions and Centralized Planning functions.

LOB Functions. There are three functions that must be performed by each business unit for each product or service offered; these are described below.

Planning for Quality. Planning for quality as an integral part of overall product and service planning is the key to success. Clear plans and measurable objectives for

Dimensions of Product or Service Quality

- Performance (primary product or service characteristics)
- Features ("bells and whistles")
- Reliability (frequency of failure)
- Conformance (match with specifications)
- Durability (product life)
- Serviceability (speed of repair)
- Aesthetics ("fits and finishes")
- Perceived quality (reputation and intangibles)

This list provides a framework for quality strategy. Relative importance may vary; a product or service may need to be high in one dimension but can be lower in another, depending on the customer's requirements.

all steps of the Product Realization Process must be developed as early as possible and built *into* the strategic planning process. These plans and objectives then drive subsequent steps and form the basis for reviews and audits. Figure 3 suggests some of the plans that might be developed at each step in the process.

Reviews, Audits, and Controls. Reviews form a series of "gates" at key milestones that ensure that plans and objectives for every product or service are met. Emphasis is placed on reviewing plans and documentation as well as the product or service itself (see Figure 4). Audits and controls throughout the process maintain a consistency of internal procedures, calibration and maintenance of equipment, and quality testing.

Feedback and Improvement. The first two elements of the IQS are feed-forward and prevention functions. They seek to drive the Product Realization Process to achieve customer satisfaction at a low cost with the initial offering of a new product or service. A feedback and improvement system is also needed to correct those product or service problems that do occur; to respond to changes in market forces or to new technological developments; and to optimize the process to further enhance customer satisfaction and reduce costs. Some feedback activities that span the entire Product Realization Process include

- Customer satisfaction surveys
- Quality cost tracking
- Field performance tracking
- Failure mode analysis
- An internal quality information system.

And this information calls for action to

- Search for quality and productivity improvement opportunities
- Optimize processes
- Ensure consistent requirements
- Set priorities and track problems and solutions
- Eliminate root causes of problems.

Centralized Planning Functions. The remaining three IQS functions are those shown at the base of Figures 2, 3, and 4 and described in detail below.

Policy, Standards, and Coordination. This function is best managed at the corporate level to form the foundation for the product/service-specific functions performed by the LOBs. The principal activities that take place in the Corporate Quality Planning organization include the following:

- Providing leadership in the development and implementation of an integrated quality planning and management process for AT&T.
- Ensuring the integration of quality planning with other planning processes, such as the Product Realization and Computer Integrated Manufacturing (CIM) processes.
- Focusing resources on the resolution of key specific quality issues such as marketplace-based quality objectives, component quality, and cost of quality.
- Coordinating the resolution of cross-LOB issues.
- Developing a quality reporting process in our new environment.

Theory, Methods, and Tools. To ensure consistency and efficiency, this function is also carried out primarily by a central organization—the AT&T Bell Laboratories Quality Assurance Center—on behalf of all the business units. Some general areas of Bell Laboratories work include these:

- Developing and maintaining the statistical, engineering, economic, and managerial aspects of the theory and methods for each step.
- Providing analysis tools for use in the design and manufacturing environments.

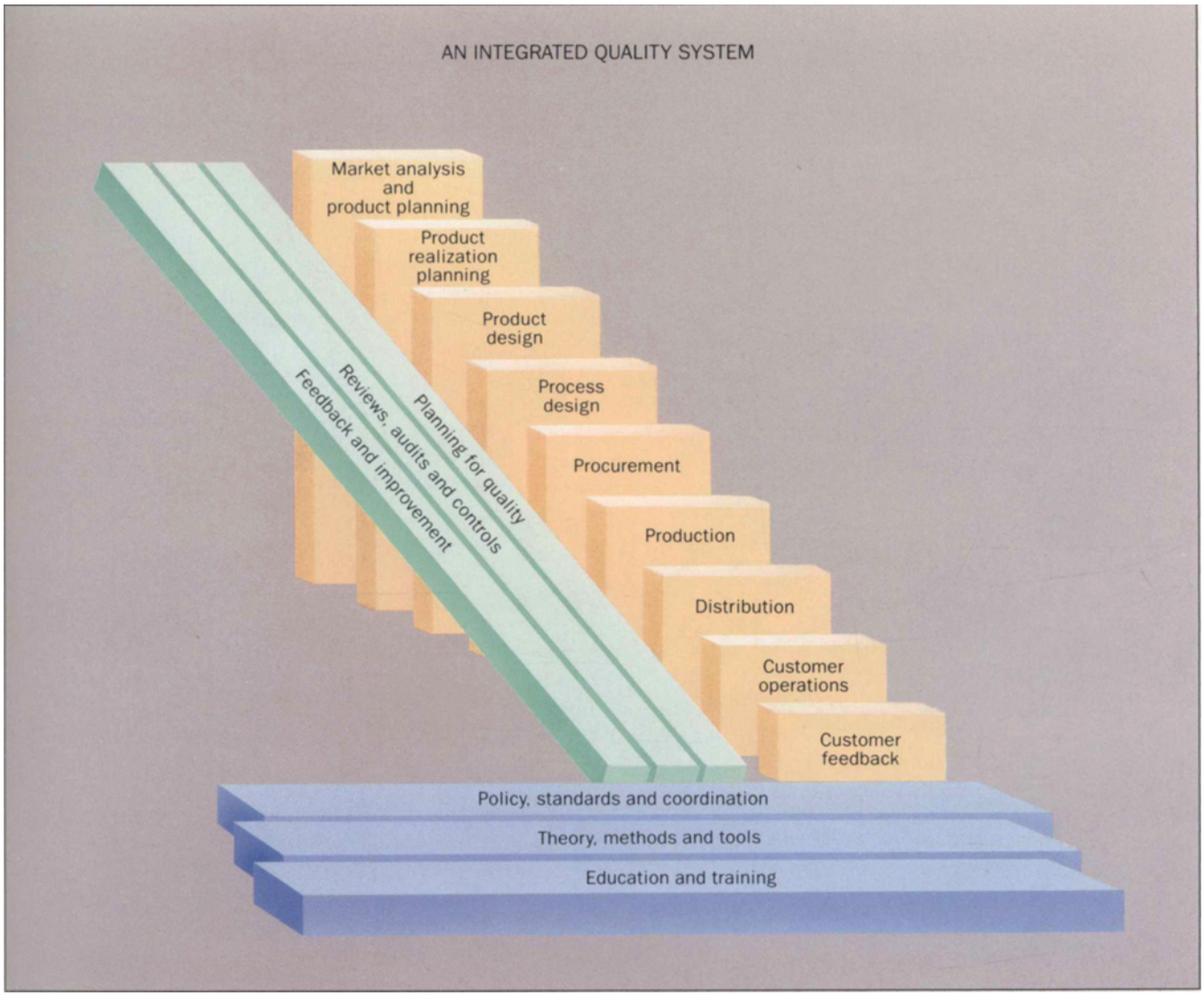


Figure 2. The Integrated Quality System. The three functions shown on the diagonal are operational quality functions that must be performed by the lines of business. The three functions shown at the bottom are the corporate functions that form the foundation of the IQS.

- Consulting on special techniques.

Education and Training. As a key foundational element of the IQS, education and training is also performed primarily at the corporate level—by Bell Laboratories and by the Corporate Education Center—on behalf of each business unit, again in the interests of consistency and efficiency. Some areas in which education and training are offered include the following:

- Understanding of the strategic importance of quality in our present environment
- Planning and analysis tools and techniques
- Special training for quality management organizations.

IQS: A Summary

To summarize, the Integrated Quality System being developed at AT&T today can be described by four characteristics: First, it is planning-intensive. That is, it recognizes the efficiency and economy of building in quality

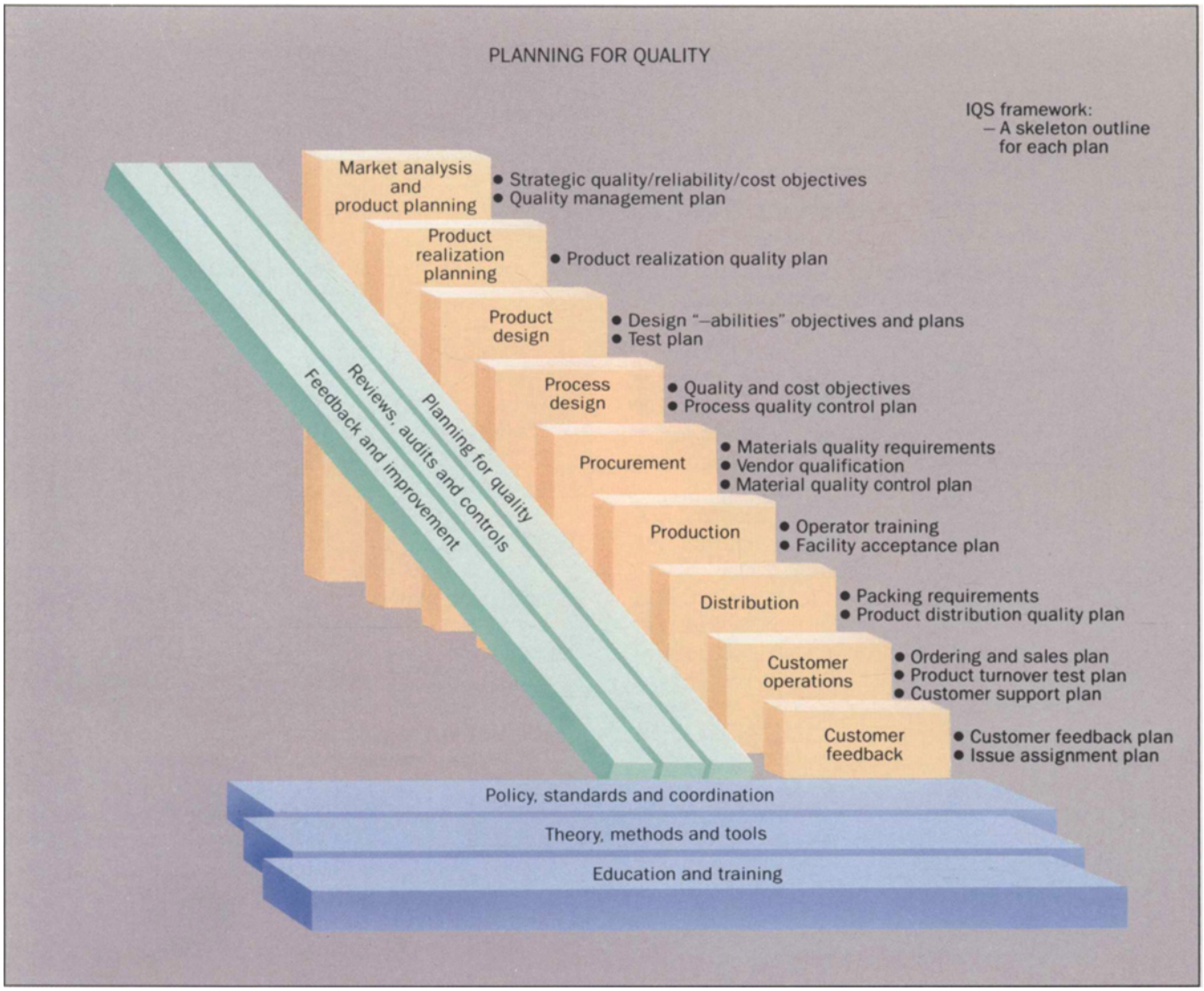


Figure 3. Planning for quality. Note that the strategic/quality/reliability/cost objectives are based on market analysis. These market-driven objectives provide a goal against which subsequent activities can be measured.

from the very beginning of product or service conception, rather than of "inspecting in" quality at the end of the realization process. Second, it is people-intensive. That is, it stresses the importance of individual input, and recognizes that continuing education and training are critical to the achievement of quality. It also stresses the importance of teamwork across organizational boundaries. Third, it is process-intensive. That is, it underscores the importance of focusing on our processes—our physical, information, and management processes—as the primary means for ensuring quality. The complexity of the technology embedded in our products demands this. Fourth, it is perfection-intensive. That is, it sets as a goal zero defects and complete customer satisfaction. Anything less than this as an ultimate goal suggests a level of corporate complacency that a competitive enterprise today cannot tolerate.

Critical Areas of Focus

As AT&T's new emphasis on quality extends to every step in the Product Realization Process, its success will depend heavily on our ability to focus on two areas:

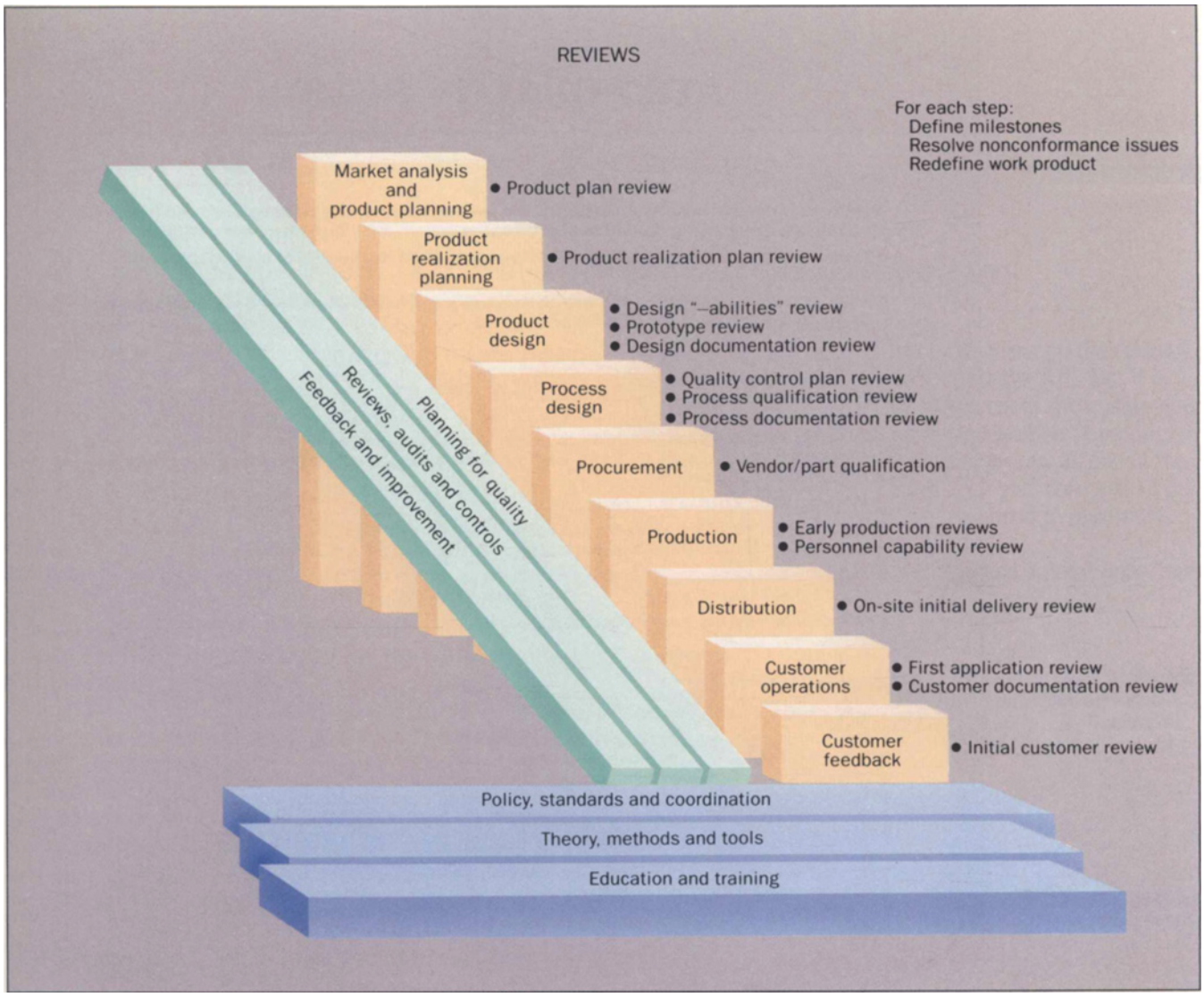


Figure 4. Reviews, audits, and controls. IQS places a heavy emphasis on audits and controls of the process. Product quality follows naturally when the underlying processes are well controlled.

process quality and company-wide quality management.

Process Quality. There are three kinds of processes mentioned above that are at work in our efforts to deliver a product or service to the customer. These are

- The physical processes that are used to actually manufacture, deliver, and support the product or service
- The information processes that are used to develop and describe the product or service, the manufacturing processes and associated facilities, and the volume and mix of products and services to be manufactured and delivered
- The management processes that determine the direction our business will take and the structure within which the first two processes are brought into being.

It is, therefore, essential that we focus on the quality with which we develop these three processes and the manner in which we integrate them in deployment. The increasing information intensity of our technology requires that controls focus on these processes and that product quality be fundamentally determined by in-process controls, as opposed to reliance on product inspection.

AT&T QUALITY POLICY

POLICY

Quality excellence is the foundation for the management of our business and the keystone to our overarching goal of customer satisfaction. It is, therefore, our policy to:

- **Consistently provide products and services that meet the quality expectations of our customers.**
- **Actively pursue ever-improving quality through programs that enable each employee to do his or her job right the first time.**

INTENT

Quality will continue to be a major, strategic thrust in AT&T. It lies at the heart of everything we do.

Through active planning in every function in the company, we will strive to provide products and services that consistently meet all quality, schedule, and cost objectives. Furthermore, we will dedicate ourselves to continually improving the quality of our products and services by focusing on our processes and procedures.

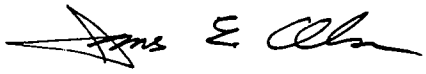
Every employee is a part of our quality system. In particular:

- Each of us will strive to understand and satisfy the quality expectations of our customers (meaning the next internal organization in the process as well as the eventual end-customer).
- Each of us will strive to identify and eliminate the sources of error and waste in our processes and procedures.
- Each of us will aid the quality-planning and improvement efforts of others for the good of the corporation as a whole.

RESPONSIBILITIES

In implementing this policy, each line-of-business/entity head is responsible for:

- Communicating the quality policy to each employee.
- Clarifying specific responsibilities for quality.
- Developing and reviewing strategic quality plans and objectives on an on-going basis.
- Implementing a quality management system to carry out the plans and achieve objectives.
- Monitoring and continually improving the level of customer satisfaction.
- Monitoring and continually improving the defect and error rates of internal processes and systems.
- Developing joint quality plans with suppliers and other business partners.
- Implementing, funding, and reviewing specific quality improvement programs.
- Providing education and training in quality disciplines for all employees.



James E. Olson
AT&T President and Chief Operating Officer

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Increasingly we are finding that it is high *process quality* that generates high *product quality.*

Company-wide Quality Management. To respond to the marketplace, it is essential to extend the scope of quality planning to all our operations. This expanding view of quality includes

- A view that all business activities are processes whose quality can be improved
- A view that the next internal process is a customer and that the customer's needs are the most important
- A view that quality improvement never ends.

To succeed, the quality effort must have the full, enthusiastic, and continuing support of employees at all levels of the business.

At AT&T, the job begins at the very top of the organization, with visible commitment from the leaders of

the corporation. For example, James E. Olson, AT&T president and chief operating officer, has issued a policy on quality (shown in the panel on page 28), providing the basis for employee action at all levels. In addition, company leaders are reviewing the quality plans of each business unit and the quality operations of each factory and service-delivery group; a top-level manufacturing assessment emphasizes that quality is key to manufacturing success and sets out specific initiatives and corporate goals for improved quality management; and the president and other company leaders are actively supporting the efforts of the American Society for Quality Control.

The quality-improvement job also extends to all managers, for it is they who translate top-level policy into daily action. Their responsibilities are also outlined in the policy statement on page 28.

Finally, the job of quality improvement extends to every employee, each of whom is charged with the responsibility to understand how his or her job relates to the customer's expectations, to identify and eliminate sources of error, and to contribute to overall quality-improvement processes. These responsibilities give our employees an increasing opportunity to participate in the organization of the workplace for quality and productivity improvements.

Ultimately, we can say that quality is everyone's job in the new AT&T, for all employees have suppliers inside or outside the company who deliver work to them. The job of every employee is to work with his or her supplier to ensure quality in whatever is delivered and to drive any problems upstream for correction.

Also, all employees have customers for their output, either next in the process or outside the company. The job of every employee is to ensure that each customer is satisfied—to see that only quality products or services flow downstream.

Attention to the two areas described above—process quality and company-wide quality management—will enable AT&T to utilize quality as a competitive edge in the marketplace; and to perfect and integrate further all our processes for faster response to change, more timely introduction of new products and services, better process quality, and higher quality end product.

A Challenge and an Opportunity

Other articles in this issue focus on the technological tools being developed to support the IQS. But it is important to emphasize that, to succeed, the quality effort must recognize the need for the integration of processes, and must focus on the *improvement process* as one of the important agents of integration. For only then will all the tools, technologies, and training be used to maximum effectiveness.

We have a great challenge and a great opportunity ahead of us.

Reference

1. D. A. Garvin, "Product Quality: An Important Stategic Weapon," paper presented at AT&T Bell Laboratories Management Forum, AT&T Bell Laboratories, Holmdel, N.J., October 10, 1985. Videotape available from Library Network operated by AT&T Bell Laboratories.

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