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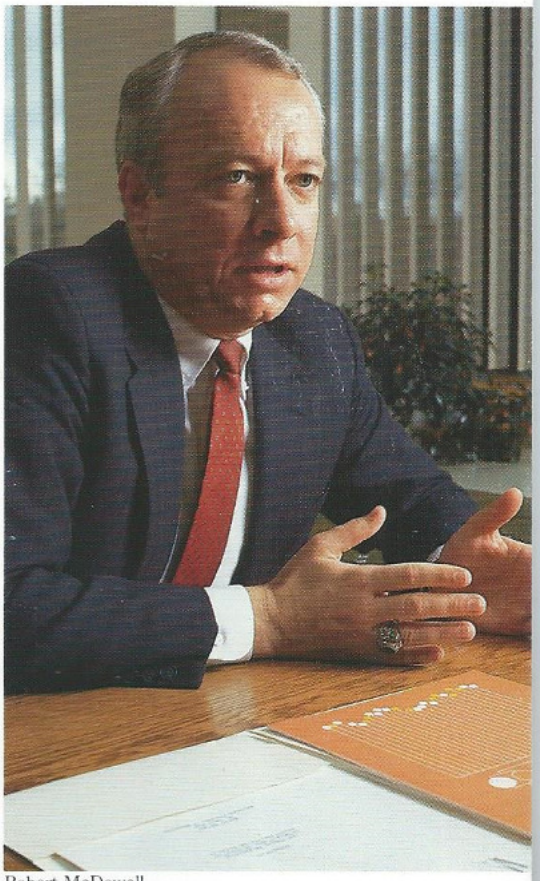
Richard L. Nolan and David P. Norton



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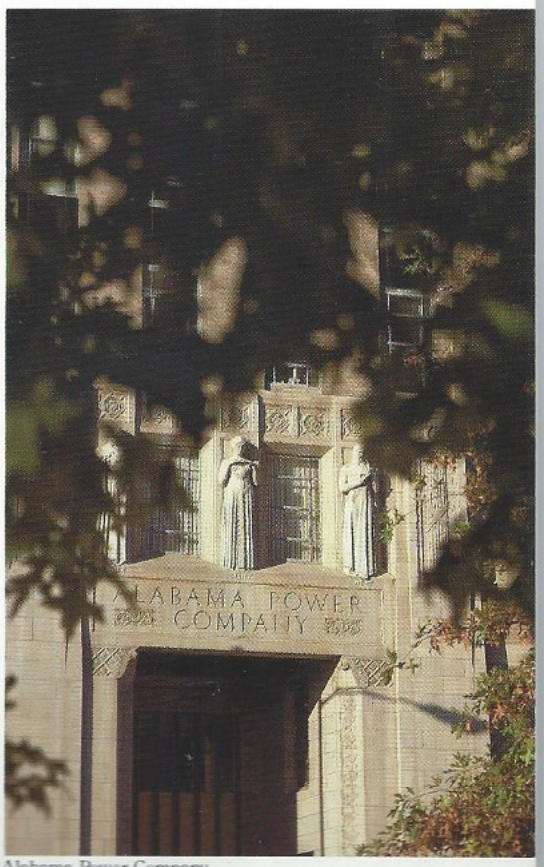

Alabama Power Company

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Recharting Business and Computing in the Decade Ahead

From an interview with Richard L. Nolan[1]

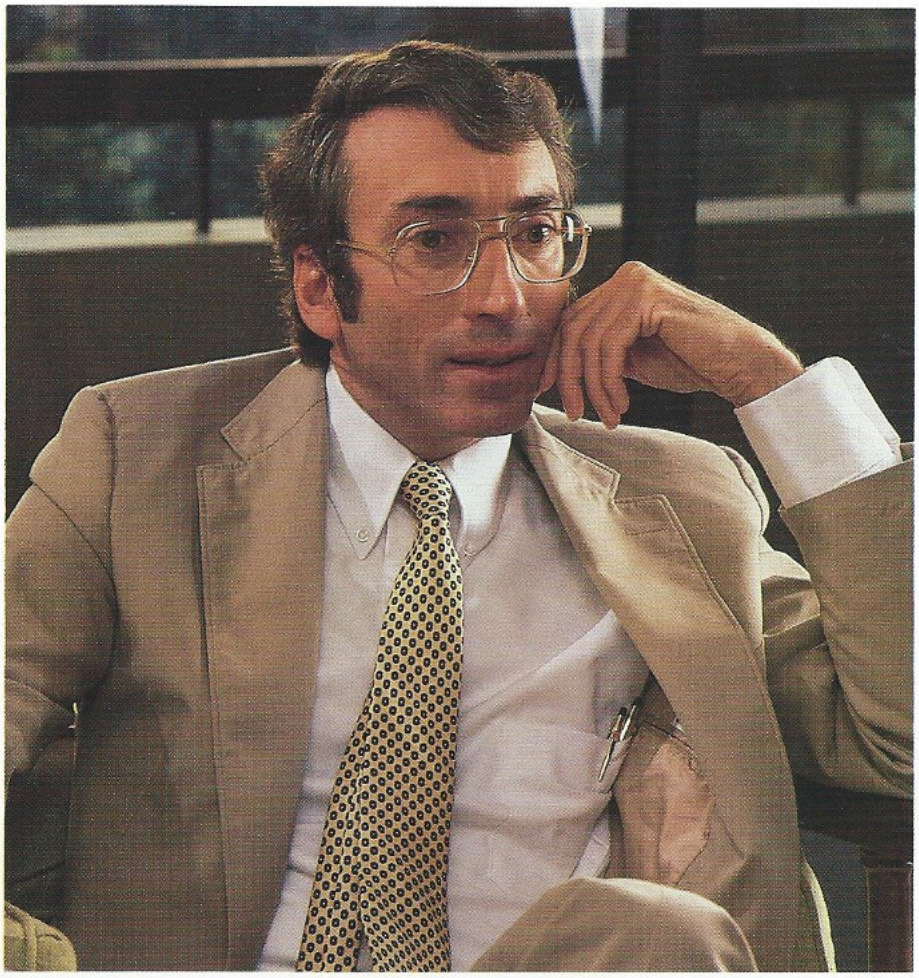
Nolan, Norton & Company (NNC) was founded in 1974 by Richard L. Nolan and David P. Norton. Building on the work they had done at the Harvard Business School, they formed a consulting firm to help clients establish a balanced approach to managing computers. Ten years later, NNC has become one of the leading consultancies specializing in information technology. With offices in Lexington, Massachusetts, Chicago, San Francisco, London, and Milan, NNC provides a comprehensive range of services to a diverse client base including many of the Fortune 100 and major European-based companies.

In addition to their consulting work, NNC is also known for its research and educational programs. Efforts such as the Research Symposium, the Architecture Working Groups and the Computer Executives Symposium (all mentioned in the following pages) indicate the depth and variety of NNC research efforts. Educational programs ranging "from the tactical to the strategic" are designed to help individuals and organizations keep up-to-date in this rapidly changing field of information technology.

Richard Nolan, Chairman of NNC, is responsible for the strategy and direction-setting activities of the firm. He has consulted with dozens of organizations worldwide and participates regularly in research and educational efforts of the firm.

Dr. Nolan is the author of seven books and more than 100 published articles on information technology management. He is the originator of the Stages Theory for analyzing data processing growth, a theory he researched and developed while he was an associate professor at Harvard Business School.

Dr. Nolan has also held positions at the United States Department of Defense, the University of Illinois and Boeing. He has a Bachelor of Arts in production and operations research, a Master of Business Administration in organization and a Doctorate of Philosophy in business administration from the University of Washington.



Editor's Note: The Consultant *sent several editorial representatives to the Nolan, Norton & Company (NNC) research symposium, "Recharting Business and Computing," in Tarpon Springs, Florida in December, 1984. In his opening remarks, Richard Nolan explained that the symposium brings closure to 10 years of trying to help clients "think through the role of computers in business." He explained that today there is an "organizational readiness" to rechart business and begin using technology strategically. In his presentations and in a subsequent interview with* The Consultant, *Dr. Nolan discussed how the role of computers must change for "doing business" in a global economy.*

Readaptive strategies may be the key to survival

George Lodge coined the term "the American disease" in his book of the same name.[2] The American disease is a failure of both business and government to shake our complacency from the 1950s. Our focus has become too short-term. And now, short-term profits aren't adding up to long-term viability. Some kind of rebalancing is needed.

In another book, *Renewing American Industry*[3], Paul Lawrence and Davis Dyer noted that surviving industries (mature ones which have successfully "survived" a fast growth stage) seem to share at least one thing in common. They have developed what he called "readaptive strategies," which means that they are simultaneously efficient and innovative.

The parallels to the management of the computer within organizations is striking. DP Managers have been managing a "business within a business." The key to survival may be in developing readaptive strategies where we can strive for efficiency to keep costs in line and competitive, while at the same time, create and maintain an organizational climate and culture for nurturing innovation.

Making the transition to the Micro Era

In 1973, I published the hypothesis for what we now call the Stages Framework.[4] This framework presents a logical progression for how organizations learn to use computers for doing business. It suggests that learning takes time, that it takes place in predictable stages, and that different management strategies are required to move through each stage efficiently. [See Figure 1.]

We have already defined Stages I-III—Initiation, Contagion, and Control—as the DP Era. Most large organizations have moved through these Stages and have entered—or are about to enter—the three Advanced Stages. For most organizations this is a time of technological discontinuity as they make the transition from the DP Era to the Micro Era.

Only recently have we been able to formulate the first explicit explanations of the Advanced Stages. Stage IV, Integration, is the process of integrating the mature DP technology with the relatively immature proliferation of microcomputer-based technologies. Stage V, Architecture, is the process of designing a computer architecture for doing business. Stage VI, Demassing, is the process of developing the organizational structure for simultaneously striving for efficiency while sustaining innovation.

In contrasting the DP Era with the Micro Era, we find that the management challenge shifts from managing a relatively centralized DP department to managing a mixed centralized/decentralized responsibility for computers within the company. In addition, the management emphasis shifts from a focus on implementation—doing—to a balance between policy formulation and implementation. This shift will take place both because of the strategic role of computers and also because of the time required to design and build a computer architecture.

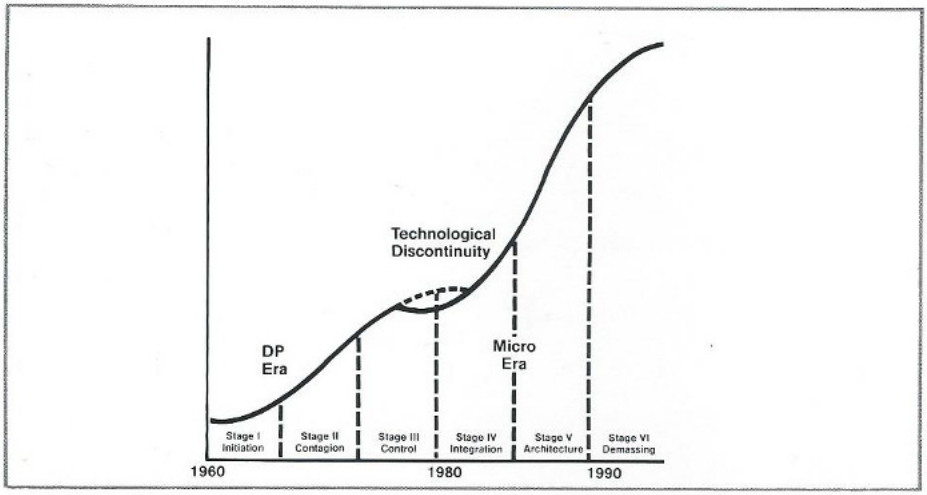
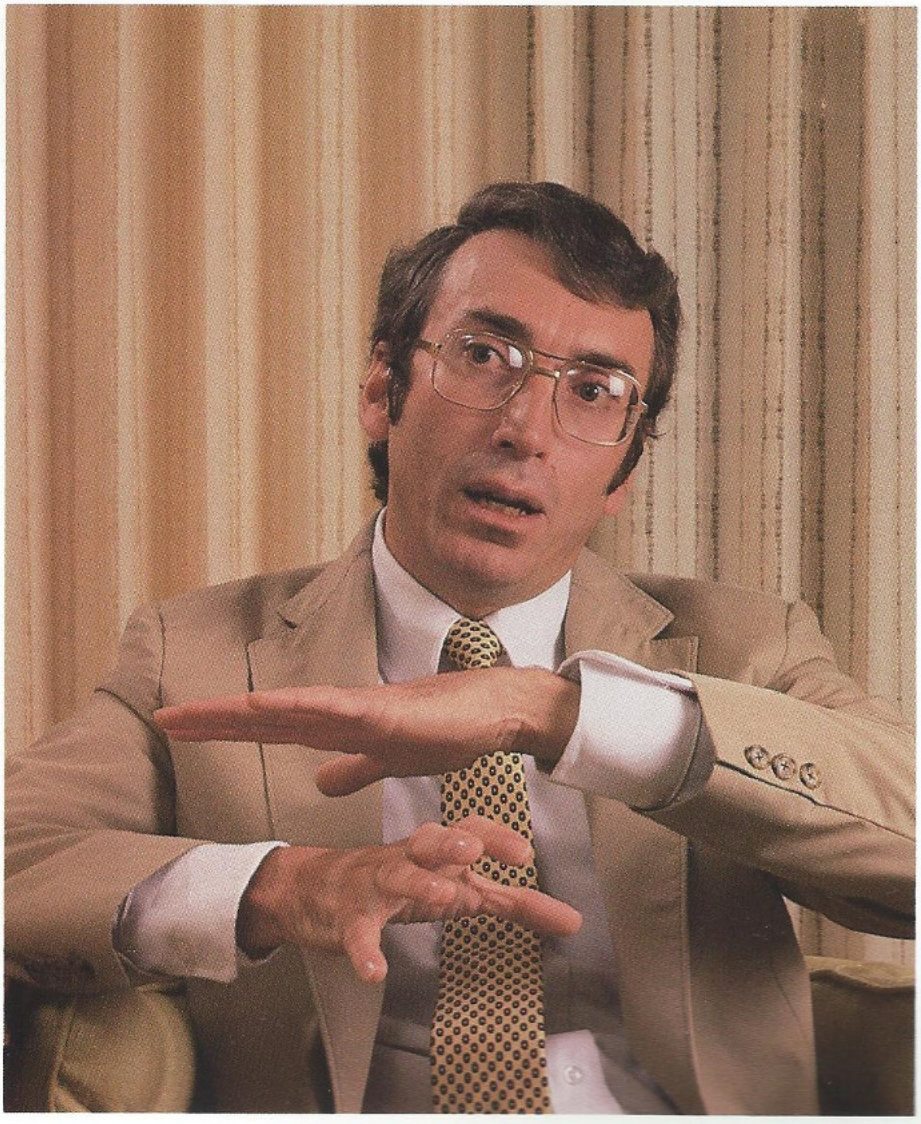


Figure 1: Restated Stages Framework. Richard Nolan's Stages Framework suggests that learning takes time, that it takes place in predictable stages and that different management strategies are required to move through each stage efficiently.



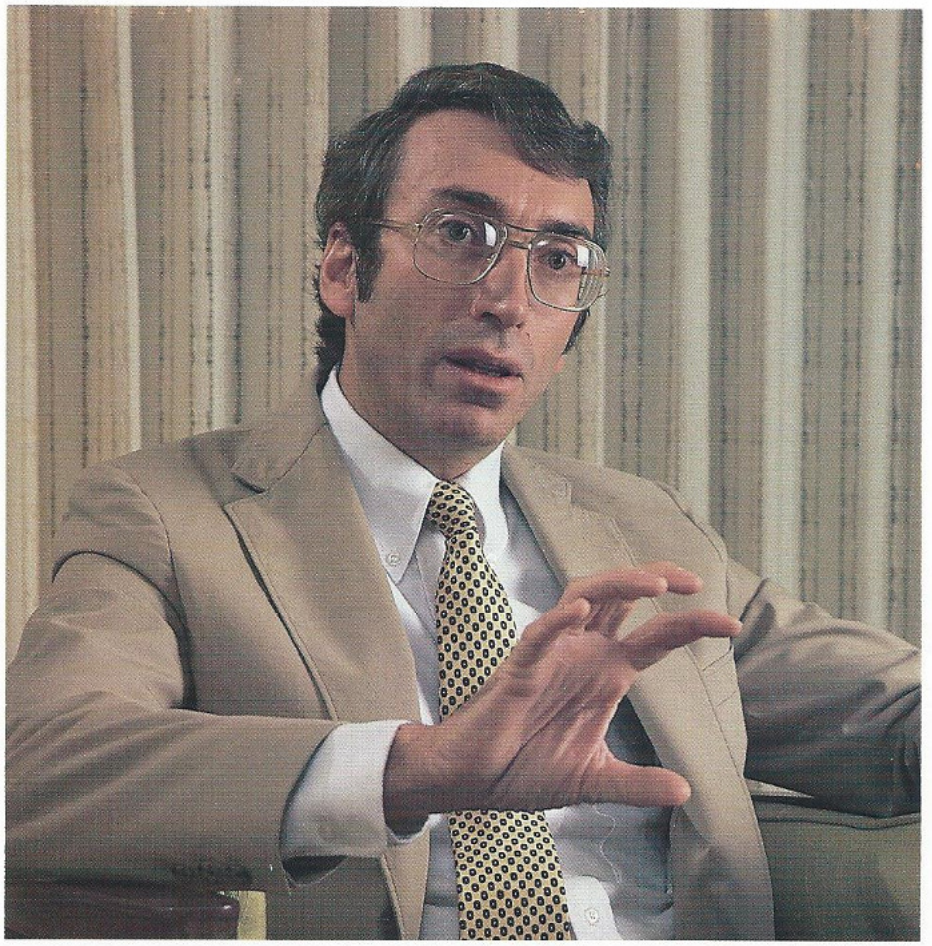
Building an architecture is a challenging task

In the DP Era, the early systems were task oriented with virtually no integration among functions. Then we began to see a level of integration within a function—payroll and accounts payable evolving into a general ledger system, for example. Next we saw a cross-functional integration which was much more complex. This is where we started saying, "In addition to taking the order with the order entry system, why don't we also send the invoice?" As these integrated systems were introduced, organizations had to manage organizational changes between different functions—marketing, accounting, manufacturing. In short, they had to do business differently. Learning how to deal with integration took some companies as long as ten years.

Now many are ready to enter the architecture environment where they will begin using technology to integrate their physical locations—Europe, the U.S., Japan. The organizational changes accompanying that will be much more difficult to manage. We are just now seeing the problems and challenges emerge. [See Figure 2.]

We have been wrestling with many of these issues for the last two years in the Architecture Working Group, consisting of NNC, member organizations, and external advisors.[5] When we saw how difficult it was to achieve the integration of earlier Stages, we found the challenge of managing Stage IV almost staggering.

First, we developed a working definition: Architecture is a structure



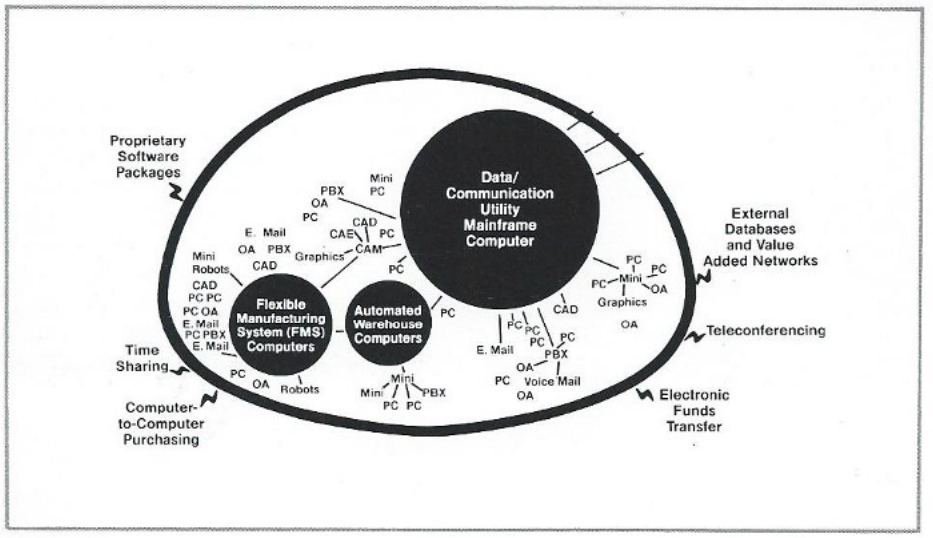


Figure 2: Architecture and Managing Stage IV—Technological Discontinuity. This picture shows a manufacturing company in Stage IV. Its diverse and multiple computer technologies is typical of many companies today. While it shows both organizational and technological fragmentation, it also poses the challenge of designing and building an architecture to enable the company to compete globally.

of computer technology for doing business. Then we began by trying to conceptualize how to use the computer in strategic ways. The more we conceptualized, the more we realized the magnitude of the job.

Starting with prototypes makes the job easier

After several months, we acknowledged that we had to get on with this complex job. We learned that almost all of the technology leaders—the breakaway companies—started with a prototype and replicated it in other areas of the business when it was successful. This pragmatic approach breaks the architecture issue down into a manageable business.

Further down the road, they started putting these pieces together—attacking integration—not from the grand scheme of things, but again pragmatically. By doing what they could do realistically, and realizing benefits, these companies dealt successively with the integration of smaller pockets. The only danger, even with this very practical approach, is that these activities don't go beyond the organization's ability to manage change.

Integration is the most significant architecture issue

Probably the most significant lesson from our working group was how important integration will become in Stage V. The readaptive process depends on everyone understanding the organization's broad purpose, ethical standards, and operating principles, with an emphasis on the value of both efficiency and innovation. Our organizational structures are changing from the classical pyramid to a diamond shape; communications are changing from hierarchical to networks. Automation has contributed to this transition, because the computer fosters both vertical and horizontal communication within the organization. [See Figure 3.] We will have to learn how to achieve vertical and horizontal integration, as well as build gateways, if we are to meet our organizations' strategic business needs.

In 1960, we would have called the middle level of an organization "middle management." Today, we define it much more broadly as a middle level containing new job classes such as "knowledge workers." The pyramid structure suggests that we are tapping

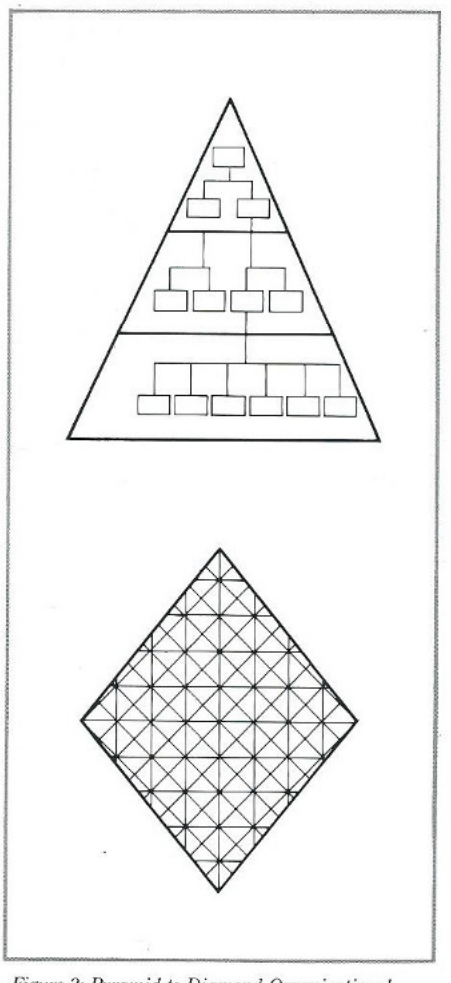


Figure 3: Pyramid to Diamond Organizational Structures. Our organizational structures are changing from the classical pyramid to a diamond shape and communications are changing from hierarchical to networks. Automation has had much to do with this transition, because the computer enables horizontal as well as vertical communications.

into this category called knowledge workers in ways that haven't been done before. It will enable us to integrate business functions such as engineering, manufacturing, and finance more tightly.

Initially, integration is a technical issue. For example, working with a spreadsheet is a stand-alone task, yet we encounter an integration problem when we try to download databases. But it's also an organizational integration because we are expanding the use of information that resides within the organization, and bringing it into the knowledge worker's environment where it also has to be integrated. Almost all of us will feel the impact of this integration in the years ahead.

Five key management issues

As our group continued grappling with this "structure" called architecture, we found several key management issues surfacing again and again. We discovered top managers trying to answer the following questions:

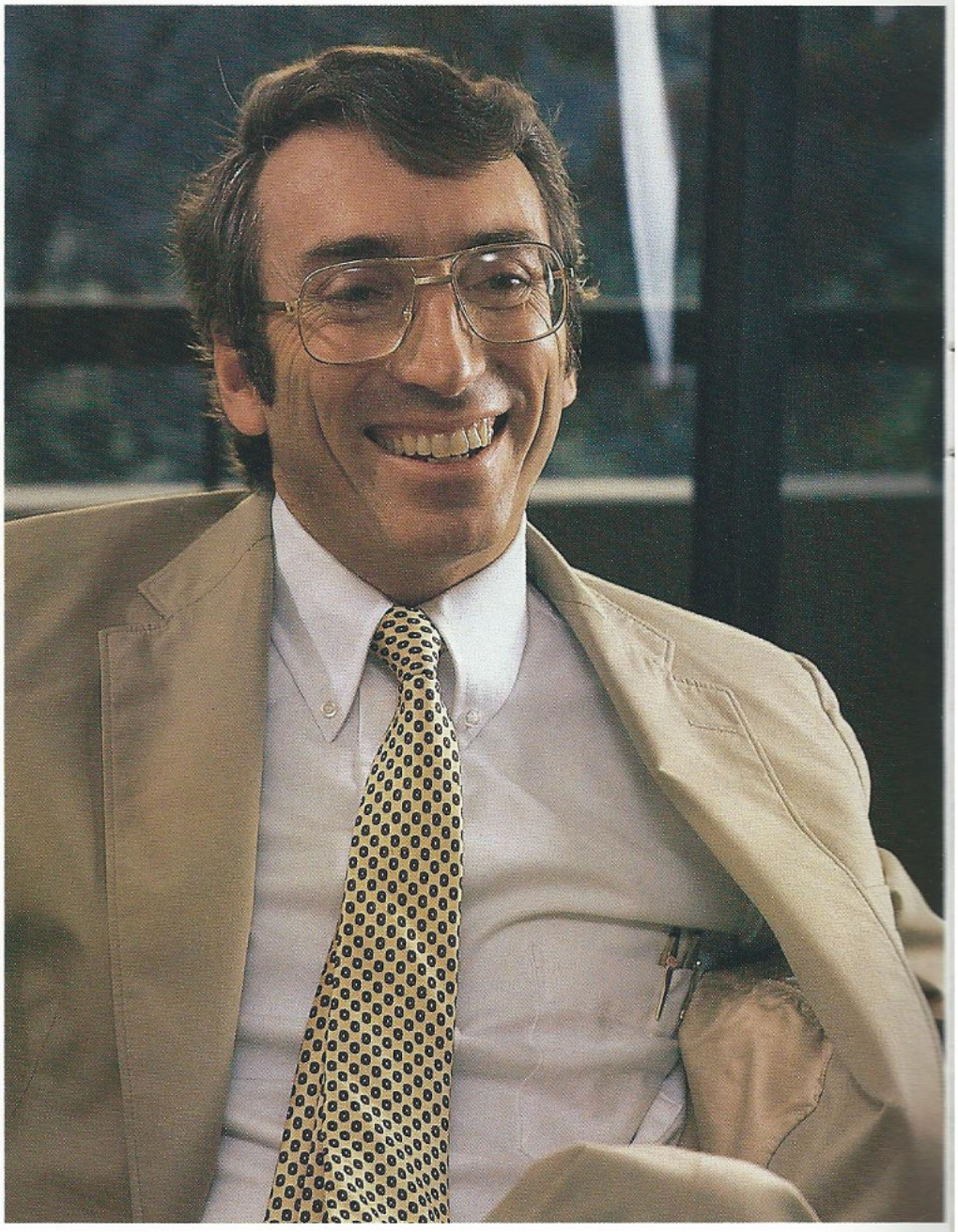
1. What computer technology should we be in (and not in)?
2. How much should we invest in each technology?
3. In what sequence should we implement?
4. How should we fund this?
5. What timing makes sense?

Each of these questions has strategic implications because it requires significant resource allocation decisions. Senior management must lead their organization through this transition. They can no longer perform their jobs without fully understanding the process of using the computer for doing business.

An important educational process must take place before sound decisions can be made. Executives must first build a knowledge base about computer technology, then dialog with other executives—always focusing on the essential issue of how to best use computer technology for doing business.

This is not an easy process for some executives, but it's one we have found to be absolutely critical. People will not enter into a dialog on subjects that make them uncomfortable. But as their knowledge and familiarity grow, they start asking relevant questions. Finally, they start bridging the base of their experience with the new subject.

Of course, executives will need help from staff groups like an architecture group, a steering committee, or a task force who will provide the background information necessary to make the decisions. But the final decisions are theirs—and their decisions can determine the strategic direction of the organization for as long as a decade or more.



A new computer executive function is emerging

Once we envisioned an executive forum on how an organization is going to use computers for doing business, we saw the need for a new executive—a peer—with specific expertise on where the technology is going, how it is being used in the organization, how well the organization has managed change in the past with complex technologies, and where the pitfalls and opportunities are. This person will be a critical source of information for the executive group.

This position of the Computer Functional Executive (CFE) has already begun to emerge in some organizations. Who's filling that function? In many cases, it's the DP or IS manager. However, many people with very deep roots in the DP function find it difficult to switch management styles.

Other CFEs are coming from outside the company. Some organizations have undertaken significant searches and brought people in at surprisingly high salaries. Occasionally, we even see a line manager from a functional area who has proven to be an excellent manager. Usually that person must appoint a deputy who has the internal DP experience.

These are difficult positions to fill, largely because the executive function is so critical. Successful CFEs build a knowledge base at the executive level, and create a technology momentum to make an architecture "happen." The CFE becomes the catalyst for shifting from planning DP projects to formulating strategies which will bring about organizational change.

Watch the breakaway companies for clues about the future

As we researched these issues we noticed that the industry leaders—no matter what the industry—are begin-

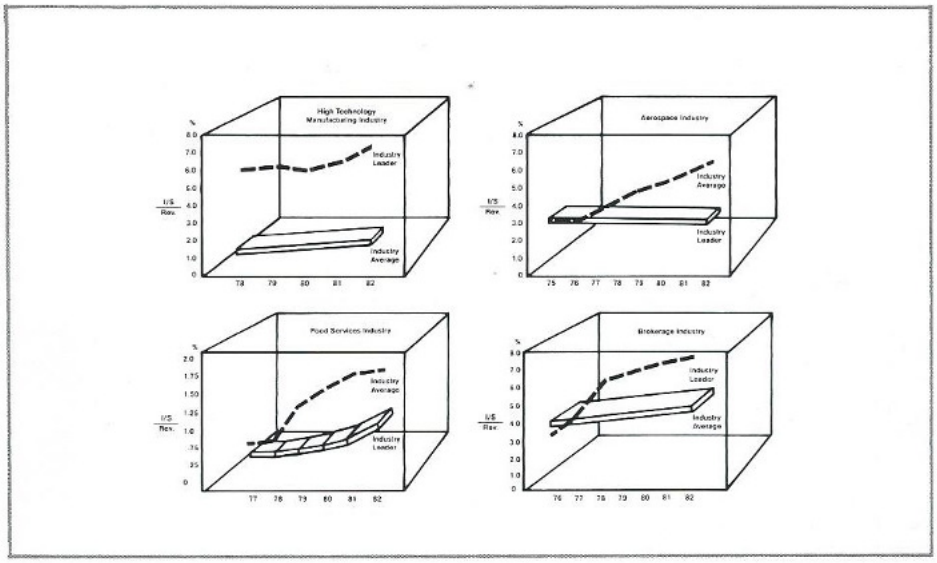
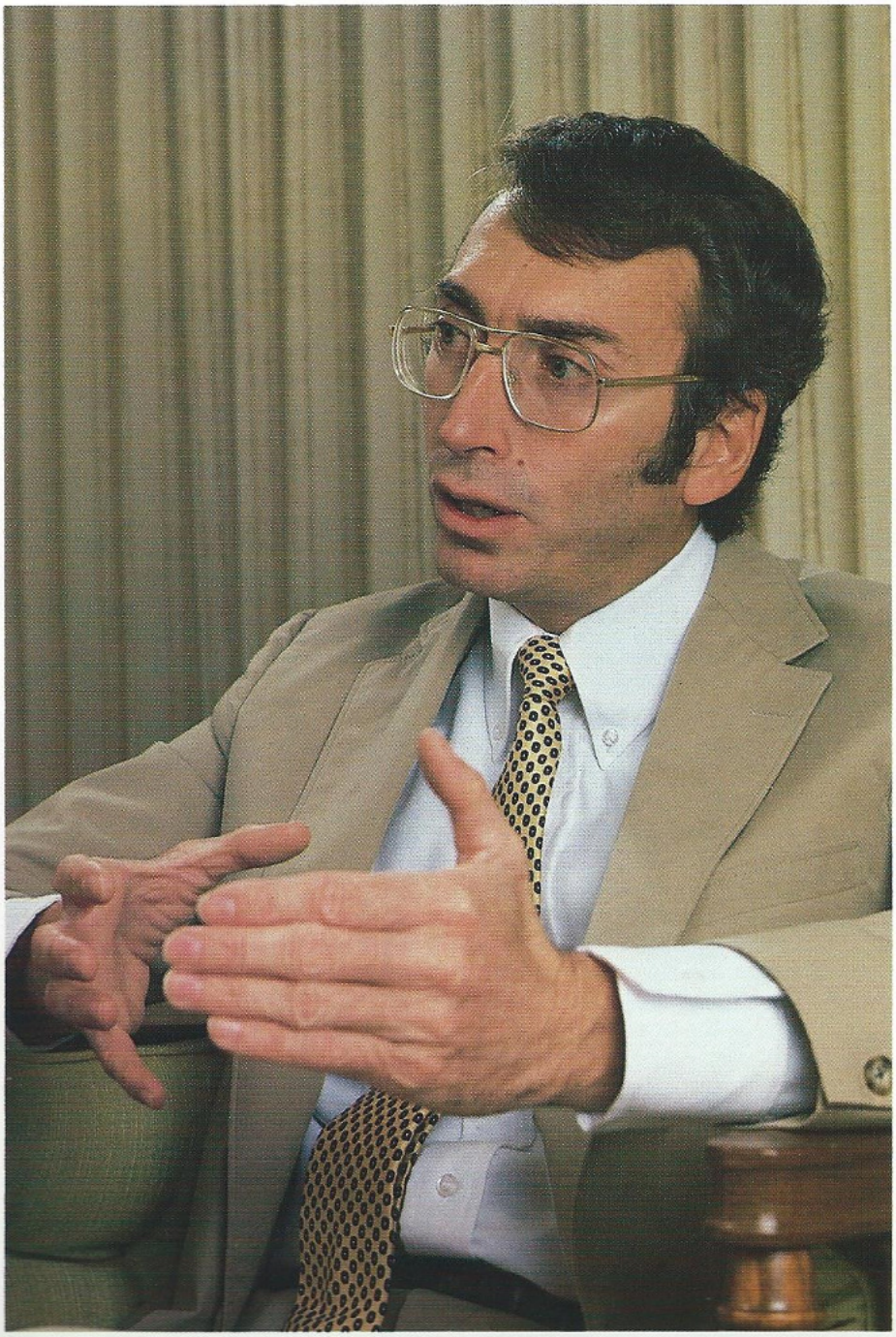


Figure 4: Breakaway Companies That Have Succeeded in Making the Transition. This illustration shows the results of case studies from four industries. The "X" axis is time. The "Y" axis shows computer expenditures as a percent of sales. The dotted line shows the Breakaway Companies' computer expenditure as a percent of sales. In all four industries, there is a Breakaway Company that is spending two to three times the industry average on technology. Each of these companies is the industry leader, and each of these companies has made computer strategy an integral part of their business strategy.



ning to break away from the others and make the transition into the advanced Stages. [See Figure 4.]

We examined four industries with more than seven companies in each. There were four obvious industry leaders in financial performance as well as peer respect. Each was spending two to four times the industry average on information systems technology.

Not surprisingly, the leaders displayed first a loose linkage, then a tightening linkage, between their business strategy and the computer strategy. They also had explicit performance objectives for their technology investments to ensure that they realized targeted benefits such as profit per employee, sales per employee or administrative costs per employee.

In short, these breakaway companies are much more robust users of technology because they can prove that it makes sense for doing business. They make excellent models for us as we begin to meet the challenges of the decade ahead.

Preparing for the decade ahead

Today's decision makers face some exciting times. Business is changing. Competition is more complex—it is global; it is faster. The role of computer technology has moved onto center stage. To survive the 1980s and beyond, executive management must use technology as a strategic business tool. They must plan for and manage the organizational changes that will occur where high levels of integration are required. The CFE must have the technology knowledge base and executive leadership skills to design and implement an architecture. Finally, at almost every level within the organization, executives and knowledge workers alike will have to develop readaptive strategies to create a new organizational environment which is simultaneously efficient and innovative. □

[1] Some information contained in this article was taken from presentations made by Richard Nolan at the Nolan, Norton & Company research symposium, "Recharting Business and Computing," on December 13-14, 1984, Tarpon Springs, Florida.

[2] George Lodge, *The American Disease* (New York: Knopf, 1984).

[3] Paul R. Lawrence and Davis Dyer, *Renewing American Industry* (New York: Free Press, 1983).

[4] Richard L. Nolan, "Managing the Computer Resources: A Stage Hypothesis," *Communications of the ACM,* (July 1973).

[5] There has been an Architecture Working Group meeting together since 1983. The Nolan, Norton & Company brochure, "Architecture Working Group 1985" explains the group's history, current objectives and approach.

The illustrations used in this article have been graciously provided by Nolan, Norton & Company for exclusive use in *The Consultant.*

Advice to an Executive on the Way to the 21st Century

From an interview with Richard L. Nolan

The following seven recommendations (in no particular order of importance) may help you plan for and manage technology as we move toward the year 2000. Practically every item mentioned holds a stereotype that must be questioned. Don't be blinded by the past. Try to understand what questions you should be asking to find out what you don't know!

1. Stop at the bank on the way. It's going to be an expensive trip! In 1980, we forecast that the cost of technology would grow by a factor of seven in the next decade. When we checked those predictions in 1984, we found that these costs have already grown by a factor of four. Our original forecast may have been a bit conservative.

David Norton says we need to start looking at this "expense" in a new way. He urges us to stop looking at the technology budget as a percent of sales and stop treating technology as an expense. He says we are experiencing a 10-year transition to what he calls the "thinking businesses" (retooling our white collar workers), and at the same time, building a very large asset that will remain with us.[1]

2. Start planning for the long term. Companies today are experiencing some of the most significant organizational changes since the Industrial Revolution. As an executive, you must understand that significant organizational changes take time.

For this reason, we have got to stop looking at technology a year at a time. Start planning in a five- to ten-year environment. I'm not suggesting that we give up short-term planning; I'm saying we must do both.

3. Create an environment where you can be simultaneously innovative and efficient. What we used to call "DP" must change so you can look beyond it and build something new. We are not suggesting that you write it off. On the contrary, at NNC we use the terms "recharting" or "institutionalizing" to convey the concept of building something new on an existing foundation. DP needs to become an efficient utility—a sleek machine—so you can free up resources and create an environment where you can be simultaneously innovative and efficient.

Don't take what you know about DP and simply apply it to office automation and the other emerging technologies; they're different. Instead, simultaneously consolidate what you've done in the DP area while sustaining new levels of innovation.

4. Start an architecture effort. This is one of the things breakaway companies are doing. Kodak is one example. They have already begun planning for the year 2000. They consciously use the term "architecture." For example, they have "architects," not "planners." These architects will have to determine exactly what an architect does. By asking the right questions and building a knowledge base, an overall strategy will evolve. This is one way of forcing the function faster than it would naturally evolve in the organization.

Kodak's approach may not necessarily be right for your organization, but begin the planning process now and start conceptualizing how you can use computer architecture in a strategic way. You may want to begin by engaging other top executives in a dialog about how computer technology can be used as a strategic tool (or weapon). It's a critical process. Until executives begin thinking this way, it is difficult to move forward.

5. Look at what your competitors are doing. Look at the breakaway company(s) in your industry and try to find out how they do what you are trying to do—planning for 1990-95, rationalizing their investment, integrating technology, tying technology to strategic business plans. What works for other companies (and what doesn't work) can be extremely helpful to yours.

Look at companies that might become your competitors in the next four to five years. A few years ago who would have predicted that Sears would be competing in the financial services arena? Look beyond national boundaries to the global environment. Surveying your competition is not as simple as it once was.

6. Look at leaders in all industries. Move away from your own industry and look at leaders in the use of computer technology in all industries, then go back and do some brainstorming. Ask, "Is there any linkage to the way we can do it here?" Frito Lay is a marvelous example. They looked at CAD/CAM to see if it had any application in the food manufacturing business. After a careful examination, they implemented CAD/CAM technology to design better chips. Now they can mass-manufacture chips at faster rates than anyone else, which means their productivity rates are up. It's quite a creative approach, yet who would have thought that a food manufacturer would use CAD/CAM?

7. Take courses; read books. Try to participate in some educational activities which look at the fundamental concepts of computers. What is their promise? What is their potential? Also, do some expanded reading. This may sound academic, but to break out of our behavior of the last ten years, we need something to unfreeze our way of thinking about this. □

[1] David P. Norton, "The Economics of Computing In The Advanced Stages," *Stage by Stage,* Vol. 4 No.2, Summer 1984 (Nolan, Norton & Company).

Suggested Readings

Bower, Joseph. *The Two Faces of Management: An American Approach to Leadership in Business and Management.* Boston: Houghton Mifflin Co., 1983.

Donaldson, Gordon and Lorsch, Jay. *Decision Making at the Top: The Shaping of Strategic Direction.* New York: Basic Books, 1983.

Lawrence, Paul R. and Dyer, Davis. *Renewing American Industry.* New York: Free Press, 1983.

Leavitt, Theodore. *Marketing Imagination.* New York: Free Press, 1983.

Lodge, George. *The American Disease.* New York: Knopf, 1984.

The following series of articles shows the development of Richard Nolan's famous Stage Theory.

Nolan, Richard L. "Managing the Computer Resources: A Stage Hypothesis," *Communications of the ACM,* (July 1973).

Nolan, Richard L. and Gibson, Cyrus F. "Managing the Four Stages of EDP Growth," *Harvard Business Review,* Vol. 52, No. 1 (January-February 1974), 76-88.

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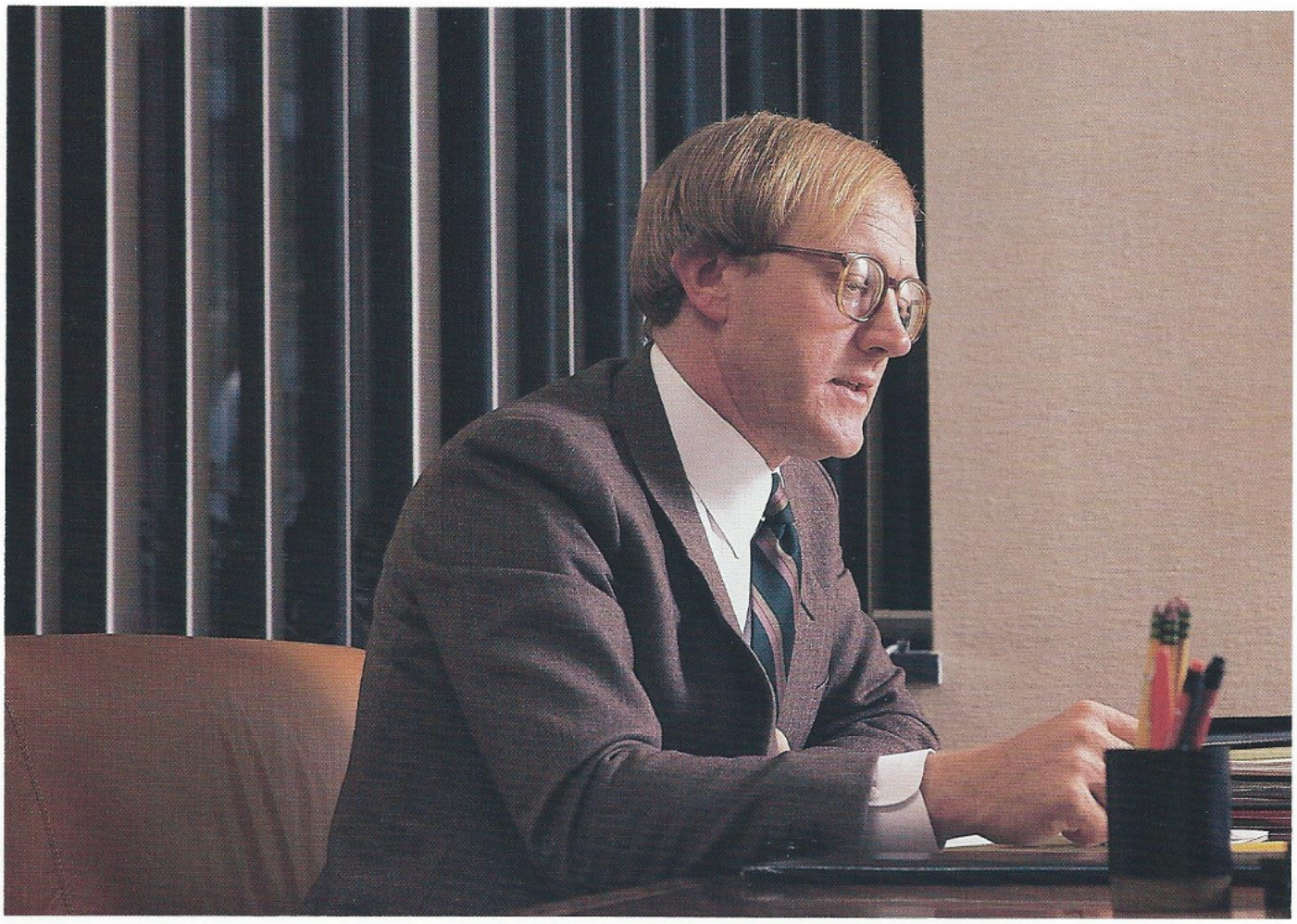
Information Technology—an Investment and an Asset

From an interview with David P. Norton[1]



David P. Norton, President and cofounder of Nolan, Norton & Company, is responsible for the executive level management of the firm. He has a B.S. in Electrical Engineering from Worcester Polytechnic Institute, and M.S. degrees in Management from Florida State University, and in Operations Research from Florida Institute of Technology. His Doctorate in Management Control is from Harvard University.

Dr. Norton has served on data processing steering committees at client organizations and is on the Board of Directors at IDC Services Inc. He has directed several major research projects for the firm, such as the ECHO study which examined the data processing management techniques required by the health care field. He has also consulted with Union Carbide, Kaiser Permanente, and Philips N.V.

The Second Industrial Revolution

Few people would argue that America's traditional smokestack industries are giving way to a new core of information related industries. The economic signals are coming from different directions, but they are consistent and clear. We are entering a period of reindustrialization—a Second Industrial Revolution—driven by advances in information technology.

We are seeing new industries born, old industries fade, traditional industry boundaries redrawn, and traditional work methods revolutionized. These changes will take a minimum of 10 years to assimilate. Some companies are already beginning to create dramatic strategic advantages with technology; others will be forced to invest defensively to avoid competitive jeopardy.

At Nolan, Norton & Company, we believe there is a prolonged period of high investment in technology ahead. For 25 years, we have treated data processing departments as "expense centers" with one-year visions. We see that as a serious shortcoming with potentially disastrous results.

Breakaway companies spending 2-3 times more on technology

When we first began our research in 1980, we saw companies we now call the "breakaway" companies spending two to three times more than their competition on information technology. We tried to find out how they could be spending so much. If the industry average is three percent, how could one company be spending eight percent?

We found that the money was going into three segments: 1) transaction processing or traditional data processing, 2) productivity aids such as the personal computer, and 3) technology niching including such things as CAD/CAM, robotics, automated teller machines, and point of sale terminals.

The cost of computing will grow 7X during the '80s

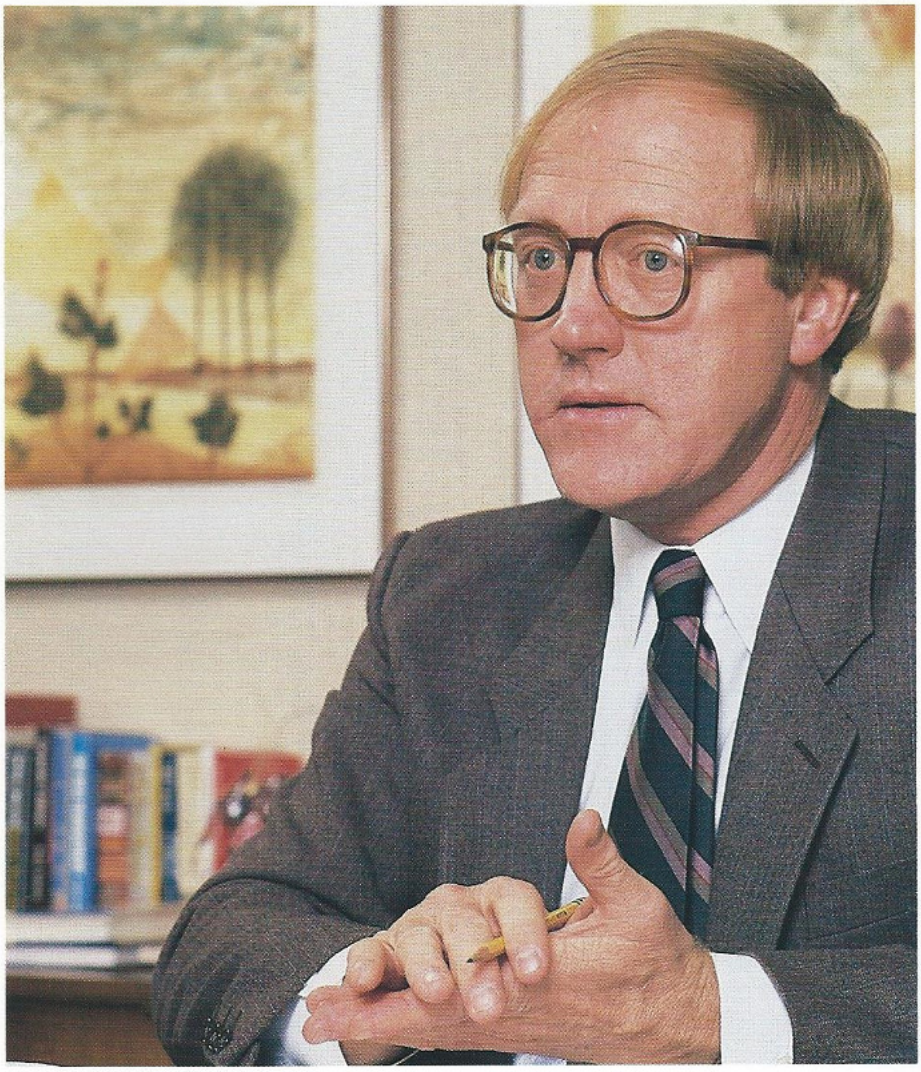
Based on these findings, we predicted that the cost of computing would grow sevenfold during the decade between 1980-1990, and it would differ dramatically from what we had seen in the past. We projected that the cost of traditional computing would double over the decade, while the other two segments would experience significantly greater growth.[2]

By itself, the "seven times" prediction did not seem so frightening—it is only 20 percent per year compounded. But when we consider that it is seven times growth on top of a number that is already very large, it can shake people up. Looking at it as a percent of sales can also be shocking. If the investment in technology is growing by 20 percent per year and sales are only growing at five percent per year, then an expenditure that is one percent of sales in 1980 will grow to an expenditure that is five percent of sales in 1990.

We must treat technology as an asset

Predictions like these forced us to question the way we manage the economics of information technology. Do we have the structures to manage capital formation, asset management, ROI? Our findings were disturbing. Most organizations used three major tools to manage the financial aspects of information technology: 1) annual departmental budgets, 2) cost/benefit analysis and 3) long-range applications planning. See the Survey of Financial Management Practices in I/S Organizations for specific findings. [See Figure 1.]

Our profession is still using the tools and techniques it began using 20 years ago. In 1960, it was appropriate to view the computer as an expense item—it was a back office machine; its expenses were not material; there was no investment base. That is not so today. Computer technology represents a sizable asset. The cost levels are material. A long-term process of capital formation is taking place.



We need new financial management structures

As we begin to see the computer as a strategic tool, the "one-year, expense management" mentality is no longer acceptable. We need new techniques which treat information technology as an *asset* and an *investment* and which will promote a strategic focus, not a tactical one.

In my opinion, two new management structures are necessary to cope with the financial management problem in the decade ahead: strategic capital allocation programs and asset management structures.

Regardless of the accounting treatment, computer systems are assets. They have 10-year lives. They go through life cycles and they demand maintenance. Applications software should be capitalized. Product management structures should be introduced which allow software to be managed like any other physical product. The tools exist; they should become standard complements of every I/S organization. We must act now. We cannot ignore this need any longer. □

Techniques of I/S Financial Management	Percentage of Companies Surveyed Who Use Technique
1 - Expense Center Management	
• Annual budgets for I/S based on "object of expenditure" accounting	100%
• Corporate consolidation of I/S expenditures from multiple divisions	50%
2 - Incremental Investment Analysis	
• Cost/benefit justification on major new I/S systems	90%
• Post-audit of estimated benefits once new system is installed	40%
3 - Long-Range Systems Planning	
• Multi-year plan for the development of application systems	70%
• Conversion of applications plan to long-range financial plan	30%
4 - Application Asset Management	
• Maintenance and production budgets by application	20%
5 - Capital Appropriations	
• Five-year plan to manage the rate of capital allocated to information technology	10%

Figure 1: Survey of Financial Management Practices in I/S Organizations.

[1] Most of the information contained in this article originally appeared in an article by David P. Norton entitled, "The Economics of Computing in the Advanced Stages," *Stage by Stage,* Volume 4, Number 2, (Summer 1984), Nolan, Norton & Company.

[2] In 1984, NNC looked at actual figures to see whether they were close to the original forecast of seven times growth in ten years. They found that the average level of spending per employee from 1980 to 1984 went from $1,500 to $6,000—it has grown by a factor of four in four years. They now wonder if the original prediction was conservative.

Information Technology — The Investment Enigma

From an interview with David P. Norton[1]

Editor's Note: *Much of the research for this article grew out of the Nolan, Norton & Company's "Computer Executives' Symposium." This symposium provided a forum for a group of 20 NNC staff, fellows, and executives from diverse organizations to discuss "The Economics of Computing." Over a period of 18 months they met to explore two issues: 1) how to describe investment strategy, and 2) how to rationalize investment strategy. The article that follows summarizes some of the important findings of this group.*

Rationalizing an I/S investment strategy

When it became clear that some companies are already spending two and three times the industry average on information technology, we asked, "How do these companies justify spending such large amounts of money on computing equipment?" We found two different rationales emerging from our research. One is that they are doing something strategically different in the way they manage their business. The other is that they are doing things that change the fundamental economics of their business.

Business objectives determine investment priorities

To explore the first rationale, we asked, "Why do organizations invest in computing?" People responded that it was part of their business strategy. So we started there. We found that business objectives fall into one of three general categories:

1) to improve productivity (e.g. lower costs, raise ROI)
2) to create competitive advantage (e.g. gain market share, differentiate product)
3) to improve management effectiveness (e.g. enhance communication, improve decision quality)

Organizations have different needs at different times, and every organization will have some objectives in all three categories. Usually, however, one category will dominate and often there is a direct relationship between the objectives and the way the computer is being used.

One major steel company is a good example. They used technology to improve their competitive position and market share during the worst period in the history of the industry. They developed a management database which they used to tell the cost of their products and identify several niches for speciality steel. By going after these niches, they were able to make a profit while their competitors were bailing out.

What we found, then, was that there are three basic ways to invest based on the company's business objectives, and a company will have a dominant theme at any given time.

Finding the Grey Cells

The relationship between business strategy and investment in technology is a complex issue. As we worked to understand it better, a concept we call "Grey Cells" began to evolve. Grey Cells define priority investment areas. Since no one has an infinite amount of money to spend, there has to be some way to identify what is the most important. We devised a scheme which allows us to break this whole question into segments or cells. The Grey Cell is simply a way of saying one part of your business is more important than another.

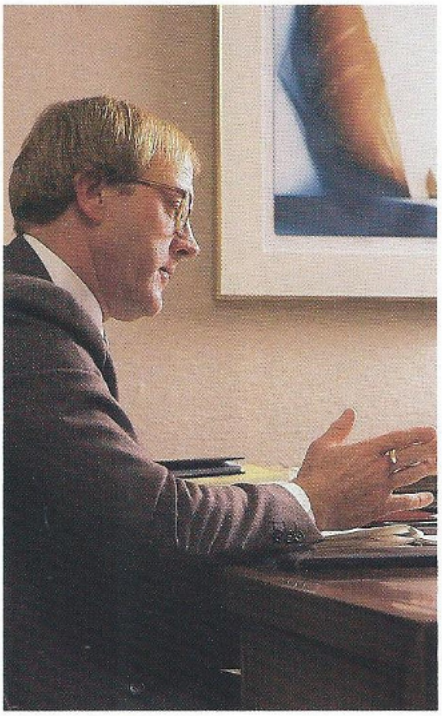
The obvious challenge is finding the Grey Cells in any organization. How did CitiBank know what their Grey Cell was? What's your company's Grey Cell? We are conducting research to try to develop some effective ways to find out. At present, however, many different approaches are being used.

One is a highly intuitive, top-down approach which tries to stimulate the vision necessary to plan for the future. There is no science for finding insight. We are trying to come up with new ideas in a period when technology is unstable. We want to be able to do things that have never been done before, knowing that whoever is first with a good idea has the advantage. The intuitive approach to finding Grey Cells is really a process to stimulate creativity.

Exemplars—how others gain the competitive edge

We have successfully used "exemplars" to start this intuitive process. An exemplar is an example of how someone did it right. Hence, we looked at many companies and tried to determine how they created a competitive edge by using the computer. We have identified eight different ways. [See Figure 1.] Then we looked for examples of organizations which did it right—exemplars.

One way companies gain the competitive edge is by putting a terminal on their customer's desk. American Hospital Supply is probably the best known example. They put an inventory control system on their computer, and terminals on the desks of the hospital pharmacists. That allowed the pharmacists to manage inventory and, at the



same time, place all their orders through American Hospital Supply. As a result, they controlled about 80 percent of the market.

When we take a client through this process, we try to find out their competitive edge. Then we try to provide an exemplar. The process is designed to begin building a vision of this organization's opportunities. Next we try to convert opportunities into Grey Cells by saying, "Here are your opportunities. What part of your organization does this affect? How does that potentially change your business?"

An analytical approach to Grey Cells

There is a more analytical approach to identifying Grey Cells that works from the bottom up. In this second approach we develop an investment template or model which links information systems strategy to business strategy.

We start by defining the objectives, then relate the objectives to classes of technology. For example, if your organization's objective is to improve productivity, which function in your business will have the greatest impact? Will the engineering function allow you to improve productivity more than the finance function? Or the manufacturing function? Let's say it's manufacturing. Since manufacturing would have the greatest impact on improving productivity, what class of technology would you use? Would you use transaction technology? Professional support? Would you automate a process? [See Figure 2.]

1. Client-controlled terminal. The terminal on the customer's desk, in the consumer's home, or in the supplier's office. The key is giving the client control over placing an order or initiating a transaction.
2. Global reach. Conquering the time/geography constraints; extending the reach of the market and operations internationally and in time.
3. Support the professional. Giving technical support to people critical to the business but lacking in technical expertise; putting non-technical people in the driver's seat.
4. Reorganizing for information flows. Creating an "information economy" model of organization to replace an "industrial" model. There are two basic thrusts: First, small workteams—the small cooperative working unit to increase the rate of innovation. Second, reducing the layers—changing from hierarchical to superordinate organizational patterns in order to get faster decision making.
5. Make managers smarter. Using shared computer technology, often in the form of business modelling, to make a quantum leap in the quality of decision making. Upgrading organizational learning. Changing the mindset from resistor to champion, from reactive to proactive, from "maintenance" to innovative.
6. Reposition the business. Using technology to move into new lines of business that were previously outside the company's traditional realm.
7. New products and services. The use of technology to create new products and/or services that extend the company's traditional market and strengthen their overall position.
8. Computer based training. Strategic education. The use of computers to upgrade the skills of management and employees. The use of telecommunications to distribute learning to management and employees directly in the field.

Figure 1: Eight Computer Edges.

Finding your Grey Cells doesn't have to be a complex process. I have seen a group of executives achieve similar results by getting together to discuss, "Where should we be spending our money and why?" The key to Grey Cells is simply this: Your investment should be focused on the areas that are related to your business strategy.

Is ROI 10% or 10X?

The second major dimension of this attempt to rationalize the investment has to do with the question, "Is it good, fundamental economics?" Any financial expert will listen to the rationale linking investment in technology with business strategy and ask one question: "Are you making money?" If the costs of computing are growing by

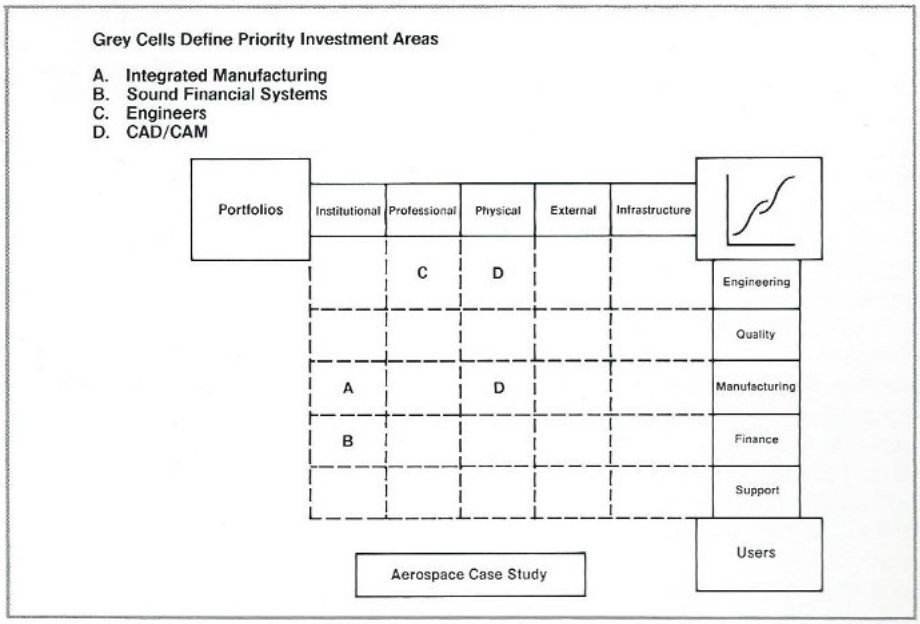


Figure 2: Grey Cells define priority investement areas (Aerospace case study).

seven times, something else is going to have to decrease by more in order to continue making a profit. So we have also focused our attention on answering the question, "How do we know that return on investment is high?"

As we began trying to learn what is different about investment in computers, we found that the traditional return on investment models don't work. For example, they derive from a manufacturing economy, and in a manufacturing economy we treat labor as an expense. But the computer is a tool for a service economy. Labor should be treated as an asset—it should not be minimized; its productivity should be maximized.

We have inherited many other legacies from the past that influence the way we manage. For example, we learned how to manage technology when it was approximately the size of the paper and pencil budget, and we are still using microeconomic tools even though technology has grown overwhelmingly. Suddenly it is five, six, even seven percent of sales and we are still treating it as an expense center and trying to project our needs within the confines of an annual budget.

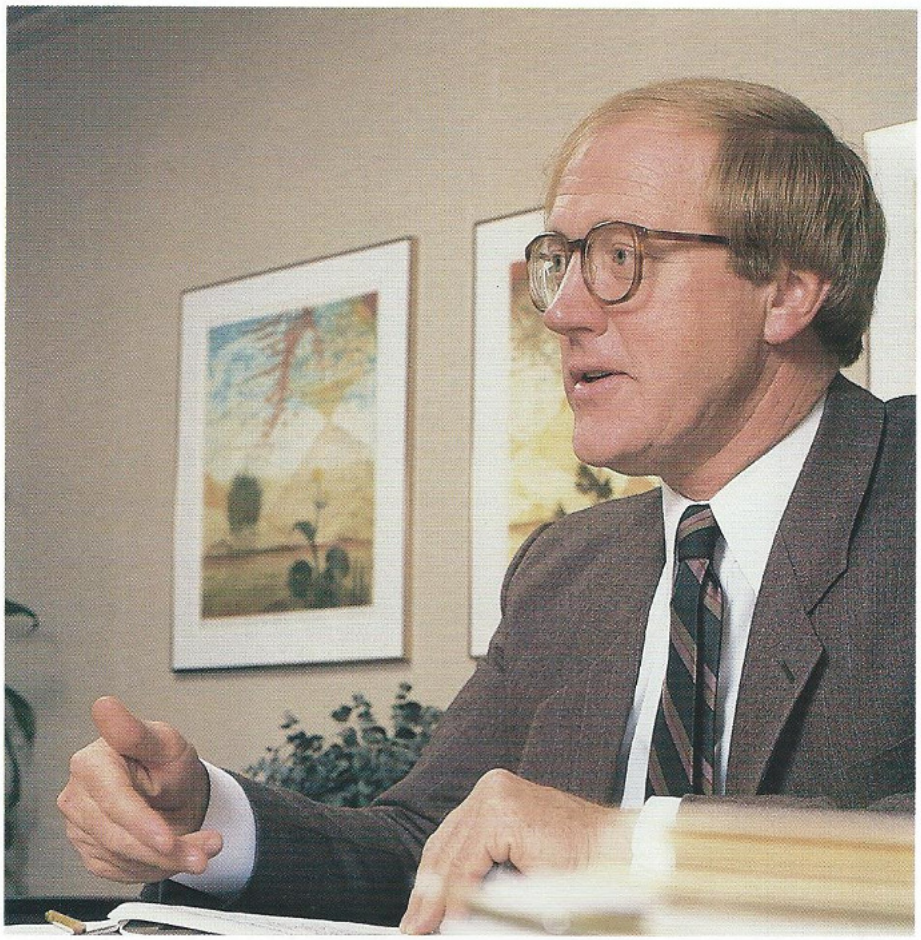
Looking at technology in a macroeconomic sense makes us realize just how significant an impact it is having. It is changing industry structures. It is revolutionizing the way we do business. It is creating a phenomenon that some of us are calling the second industrial revolution.

On the one hand, we are talking about technology having a phenomenal impact, and on the other, we are talking about management techniques that look for 10 percent return on investment. That leads to major questions about the tools and techniques we are using. Is ROI really 10 percent? I believe it is closer to 10 times.

When we start thinking about technology in new terms (invest in the technology, labor is the target of the investment) it has an impact on the fundamental cost structure and balance sheet structure of an organization. [See Figures 3 and 4.]

Cases prove 10X ROI is possible

We looked at a series of back office examples—Wall Street, banking, service—to test whether these things we intuitively feel are really happening. They *are*. It is overwhelming to look at how organizations have used technology to improve productivity. In each case, return on investment made in technology was between five and 10 times per year what was being invested. That means investing $5,000 per employee



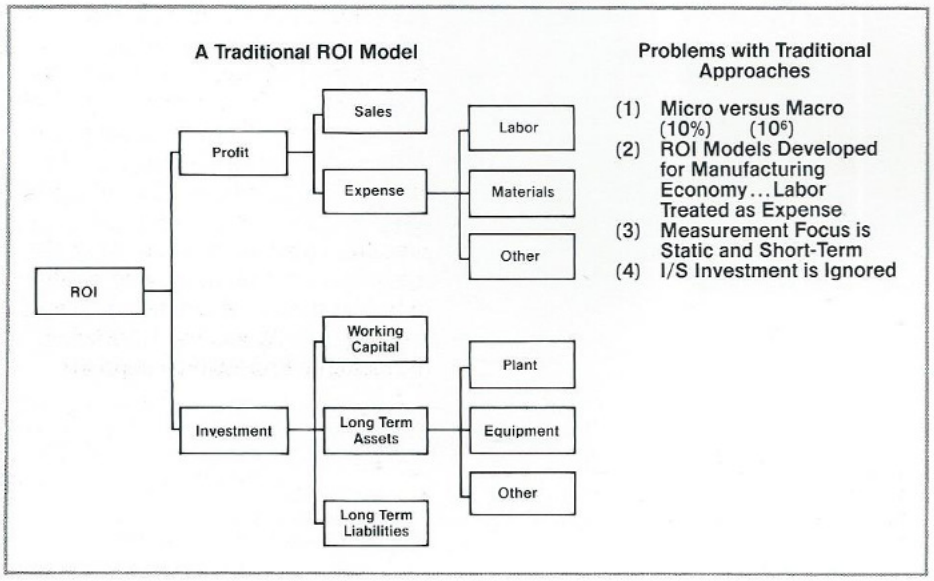


Figure 3: A traditional ROI model.

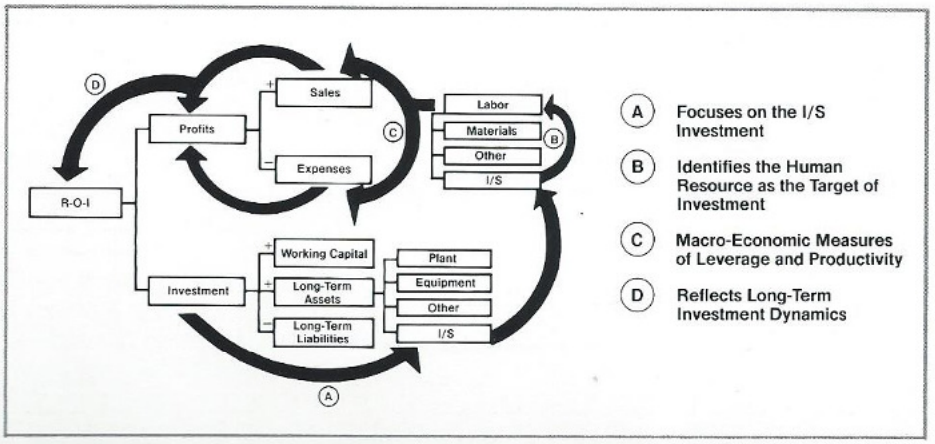


Figure 4: Impact on cost and balance sheet structures of an organization.

per year will yield somewhere between $25,000 and $50,000 per year return.

We found that if we took a high-level model of the economic structure of an organization and began looking at how it is being changed by technology, we noticed dramatic shifts taking place in measures like "sales per employee" or "expense per employee."

There is a particularly interesting example in the food services industry. [See Figure 5.] We looked at both sales per employee and expense per employee. Companies that have low sales per employee and low expense per employee are "least cost producers." They are able to keep their expenses and prices low and compete on volume. In the other extreme, companies with high sales per employee and high expense per employee are competing by differentiating their product.

We surveyed five companies and found them scattered all along the continuum. There were two companies at either extreme—one clearly competing on cost and the other clearly competing on differentiating themselves in the market. When we looked at how each was spending on technology, we found that the company with the highest sales per employee was also the highest spender on technology. They were investing in technology more than anyone and were able to differentiate their product and hence charge a higher price. The companies in the middle basically dropped out.

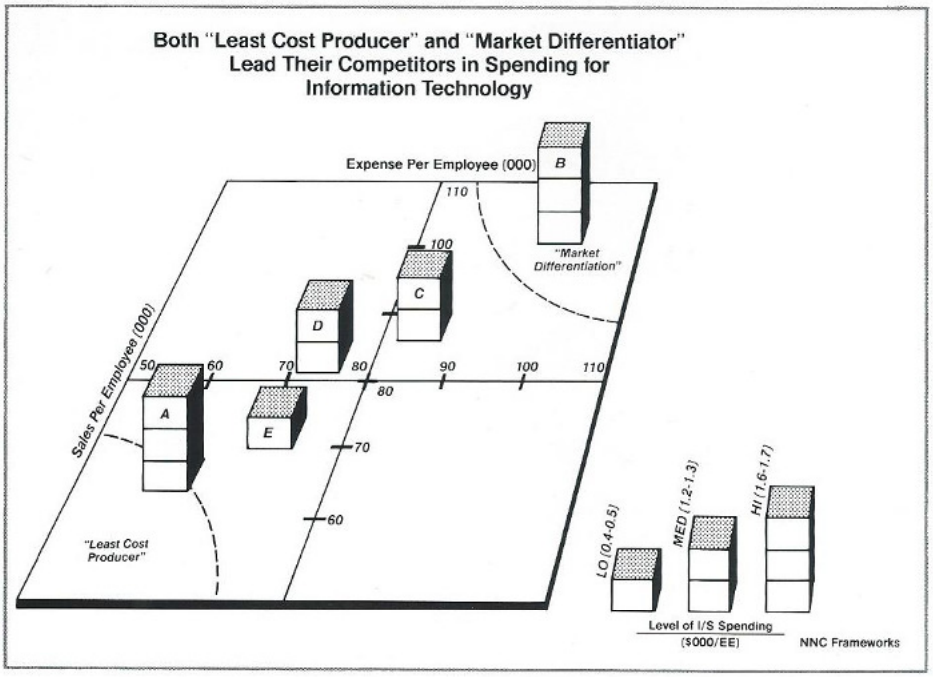


Figure 5: Food services industry example. Both "Least Cost Producer" and "Market Differentiator" lead their competitors in spending for information technology.

But the company at the other extreme was also a high investor in information technology. This organization was spending as much as the high sales per employee company, but they were spending for different reasons. They were spending to improve productivity in order to reduce cost. They were able to get savings and reductions that were greater than their investment in technology.

We are seeing the same pattern other industries as well. So the evidence is becoming very clear. Organizations can invest heavily in ways others haven't thought of to achieve a variety of objectives.

Financial frameworks refine management vision

Technology has created the need for a whole new management approach. Because of the strategic nature of technology, and because we are in this window of about 20 years where computers are changing the demographics of business, we simply cannot afford to sit back and let things happen. What is emerging is an individual who works as a member of the senior management team with the primary responsibility of linking the role of technology with the business strategies of the firm. This is a person at the top who understands how technology is being used, knows the complex issues, and helps others understand the implications and not make mistakes.

We are seeing this in the breakaway companies which are moving forward very fast. They start with a team at the top and then they build a vision that drives them forward. CitiBank started using the term "electronic banking," and it was their vision for 10 years. At John Deere, they have a vision of a factory without humans which they call the "flexible factory."

Strategy builds around these visions, and financial frameworks provide a way to refine the vision. A factory without humans is a great concept, but at any price? Probably not. Financial frameworks also provide ways to communicate the vision—break it down into manageable pieces and spread it throughout the organization. The financial frameworks will probably never give management the vision (they exist primarily to justify and control) but they will enable managers to refine and communicate the vision in ways that couldn't be done before—on a macro scale. □

[1] Some information contained in this article was taken from presentations made by David Norton at the Nolan, Norton & Company research symposium, "Recharting Business & Computing," on December 13-14, 1984, Tarpon Springs, Florida.

A Pilot Study Can Help Managers Make Sound Decisions About Office Technology

From an interview with Robert McDowell

Robert McDowell is the Product Manager for Arthur Young's Advanced Office Systems Consulting practice, based in San Antonio, Texas. Mr. McDowell has spent over 17 years working in the related areas of data processing and systems analysis, communications and office automation.

In recent years Mr. McDowell has become known for refining the structured pilot technique described in this article. Prior to joining Arthur Young, he was Office Automation Project Manager at United Services Automobile Association (USAA), a large insurance and financial service company headquartered in San Antonio.

During his last few years at USAA, Mr. McDowell devoted nearly all of his time to planning for and implementing a large advanced office systems pilot study.

Since he began directing Arthur Young's Advanced Office Systems Consulting practice, Mr. McDowell has been project leader of several major pilot implementations, including a study for a major public utility, a large paper manufacturer and a gas pipeline and production company.

He is widely published in the field and is a nationally recognized speaker. Mr. McDowell holds a B.A. from the Virginia Military Institute, and a M.S.B.A from Boston University.

Advanced Office Systems Will Change the Way People Work

Many people—including some consultants—argue that office automation will not change the way we work, that it will simply let us work faster. Nonsense! Advanced office systems, as I prefer to call them, will change the way people work in significant ways. Think about it. Why would a company spend a lot of money on products and services and increase their staff for something that will not change the way they work—only let them work faster? In my opinion, unless automation shows measurable improvement upon the way people are working now, why on earth should we bother? In most organizations, advanced office systems will probably reach the largest percentage of employees who have been least affected by technology. That means that a properly installed system has the potential to bring forth an almost overwhelming flood of new ideas. It is a tremendous opportunity for rethinking how people work.

The challenge is this: How do we manage people and resources in that kind of an environment? If we don't meet this challenge, we are almost certainly going to employ technology to do what we're already doing—more expensively!

Many people are throwing technology at an undefined problem

Today, many people have become enamored with technology as an end in itself. I view the introduction of the personal computer as a very positive technological advancement, and yet I look with amazement at how many people are literally running out to buy one. People seem to be running pell mell toward the technology, certain they need to get right on with it but unsure exactly what they're going to do with it!

I recommend a different approach. I caution managers not to become too enamored with technology until they've defined their needs. Often, we suggest a pilot which includes understanding and evaluating the company's needs, its people and resources, as well as the proposed technology.

Why a pilot is a good first step

The pilot we recommend is a structured approach. Our consultants spend approximately four weeks at the company collecting baseline data about the way the pilot group works without the technology. Then, the actual pilot study takes place over a period of four to six months. During that time, the consultants gather data about human reactions to the technology, trying to ascertain what impact it will have. At the conclusion the consultants return for approximately four weeks to collect data about the way the pilot group worked *with* the technology.

There are several reasons why a structured pilot is a good way to approach technology. First, it obtains the data an organization needs to make a logical business decision about advanced office systems. After all, these systems are really major data processing purchases; a personal computer may cost $5,000, but when multiplied by 1000, it's a big expense. Management can use this structured process to ensure that they are spending their money wisely.

Second, a structured pilot forces an organization to take a serious, disciplined look at the changes that must occur if they are going to benefit from this technology. I am not suggesting that the pilot is a way of forcing people to convert to technology. On the contrary, the pilot becomes a catalyst for causing people to rethink the way they work.

A pilot gives us an estimate of how much more text can be produced or the decrease in paper usage. But time and again organizations have also learned about benefits that aren't directly related to the technology. Installed properly, with adequate support and in a positive environment, this technology causes people to rethink how they communicate within an organization, store and retrieve information—even what kind of information they need.

Beginning a pilot—gathering the baseline data

At the beginning, we spend time trying to understand how the organization works, how information flows and what the needs are. We try to define what this system means to the organization and its potential users, and assess the real demands for service.

Interestingly, what almost always surfaces is a demand for access to an information network—not stand-alone workstations. Users want a variety of information at their fingertips. While some of that information may reside in a locally intelligent workstation, they are really asking for applications that are only available through an integrated system. In fact, all of our implementations have been integrated systems.

Looking for measurable benefits

The pilot provides a way to cost-justify advanced office systems. We look at material costs—standard things such as paper and copies—and a good deal more. In fact, we've identified over 70 measurement opportunities as a starting point. These have been devel-

oped over time based on our experience doing implementations in different industries. While all 70 may not necessarily apply in every client's case, we can go into an organization and identify and document costs that relate to the way that organization works. Next we select a pilot group that is a representative slice of the whole organization, and then measure the impact of the system on that group. At the conclusion of the pilot, we audit the process to see if, in fact, some bottom line, hard dollar effect was achieved.

Selecting the right pilot group

I don't subscribe to the current, popular theory of testing office systems in one department and expanding from there. The best way to achieve the benefits I believe are possible from an advanced office system is to view it as an application that applies across the whole organization. If an organization tries to implement it in piecemeal fashion, it will be difficult, if not impossible, to measure any impact.

As a result, most of our pilot groups represent a slice of the whole organization—and that means from the top down. It suggests some kind of "device" on the desks of senior executives, line managers, professionals and clerical employees—all linked by a network.

Implementing the pilot—the people part

This is the time when support and training are crucial. Some people have the mistaken view that office automation is so user-friendly that all we have to do is put it on peoples' desks; they will learn to use it themselves and tell us how much they love automation. Reality is something quite different.

Even in implementing a pilot, we go to great lengths to provide adequate support and training. We develop a comprehensive communications plan to ensure that there are open lines of communication with the pilot employees. If people sense that they're going to be supported, they will make their views known. We can be responsive to their views, and hence, more successful in the implementation.

During the pilot, we try to understand, among other things, whether increased staff will be needed to support this new technology. It's fine to do a cost-benefit analysis, but we must also remember to look at the "people factor." It may be necessary to increase staff for support—trainers, systems analysts, people to help with the system when there's a problem. After all, this office automation system is going to be just as important as any other production system in an organization. When it's down, it's a problem, and there should be people available to solve that problem.

The pilot's bottom line

If we've done our job right, the pilot data will help us understand the significant benefits, and identify areas for making potential changes, based on what we've learned in a live environment. As a result, we can recommend where to implement advanced office systems so that they 1) respond to users' demands for service and 2) are installed in the most cost-effective way.

I am not insinuating that we have devised a magic way to measure whether people make better decisions because they have access to this technology. I am suggesting, however, that if organizations do not go through this structured pilot approach, changes will not occur. Then they are only providing a more expensive way to do what they're

already doing. Of course there are intangible benefits associated with office systems. But I like to think of them as the frosting on the cake of an already cost-justified system. With the pilot approach, there are three areas where we can measure hard dollar benefit: 1) material costs resulting from the changes that will occur, 2) increased output which we can quantify and 3) productivity measurements that relate to eliminating positions or doing measurably more with the same number of people.

A successful cost-benefit analysis can be done—in fact, must be done—in order to install office technology effectively. If we can cause people to rethink the way they work, change the way an organization communicates or provide better access to information, then we have created an opportunity for enhanced decision-making. In the end, that can be measured by its impact on the bottom line. □

Six "Musts" for a Successful Implementation

Commitment from the top—
Top management has to be committed to looking carefully at this application that may ultimately apply to the whole organization and aggressively evaluate the issues, the changes, the benefits, the costs, and the support requirements.

Commitment to serious planning—
Office automation is a large-scale application. In most cases, our pilot studies include a potential user population of at least 25 percent of the entire organization. Implementation cannot be done haphazardly; it must begin with serious planning.

Commitment to training and support—
Organizations who have decided to implement advanced office systems must understand right from the beginning that training and support are essential for success. That doesn't mean giving a two-day course and walking away. This technology is new to just about everybody who will be using it. Training and support are crucial if users are to accept and use it.

Commitment to communications—
It is important to determine what will be necessary to make the implementation a success. This inevitably involves a variety of communications efforts including newsletters, demonstrations, seminars, possibly having a trouble shooter on hand to respond to problems or even having adequate analyst support for users who would like to see additional applications developed.

Commitment to testing—
Doing a structured pilot study to test advanced office systems is the key to success. Developing a study to determine whether or not people "like" the technology is not enough. An organization should structure a pilot study to find out—before they go through the change—how they define their needs for service, how they are going to react to the new technology, and what benefits are applicable to them. If it's done right, the pilot will become a catalyst for helping people rethink the way they work.

Commitment to cost-benefit analysis—
Skipping this step is a big mistake. Organizations make serious blunders by implementing in a piece-meal fashion—electronic mail running over here, personal computers scattered everywhere, no standardization of software. The costs can get out of hand quickly, with no way to measure them. A thorough cost-benefit analysis ensures that an organization will have some understanding of the needs before providing the technology.

Alabama Power— A Pilot in Progress

At its corporate headquarters in Birmingham, Alabama Power Company is planning and testing office information technology with the same blend of caution and vision that characterized the founders' commitment to hydroelectric power in the first decades of this century.

Alabama Power is one of four operating companies within The Southern Company, which is one of the largest investor-owned electric utility holding companies in the nation. The parent group provides electric power to more than nine million people in Alabama, Georgia, southeastern Mississippi, and the Florida panhandle.

A six-month long pilot project now under way will track time and dollar savings with the precision of an auditor's fine-tip pen. At the same time, executives and managers have begun to plan for the broad changes in corporate organization, distribution of authority, and job definitions which the revolution in information management will bring.

"We are looking to document and audit hard dollar savings," explained Walter R. (Roy) Barron, "because we are responsible through public agencies to our ratepayers as well as to our stockholders." Barron is manager of telecommunications and chairs the office automation pilot project steering committee.

About 120 people are participating in the pilot program. The project includes VT200-series terminals, DECmate word processors and Rainbow personal computers with access to an ALL-IN-1 office menu layered on a clustered pair of VAX-11/785 computers.

Expanding Company, Growing Office Needs

A new 18-story corporate headquarters now under construction will finally bring under one roof departments scattered throughout greater Birmingham. The pilot project will help define user and system needs for a fully integrated telecommunications, data processing, and office information system for the new headquarters.

Demand for electric power exploded in the years following World War II, and sparked a parallel growth at Alabama Power. New steam plants, new dams and generators, new divisions, districts, and crew headquarters were added.

Demand for office space grew along with everything else, stretching the limits of the general office building which had been constructed in 1925 and expanded in 1950 and 1958.

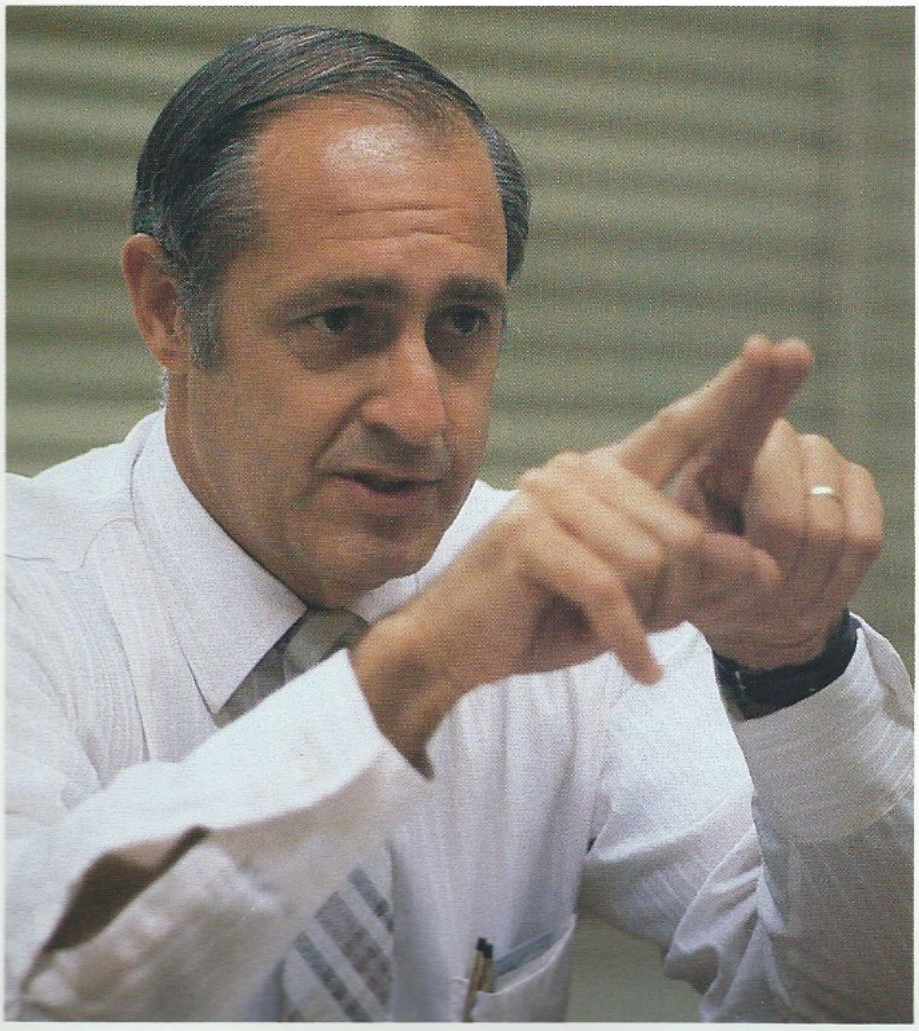
"Planning for a new corporate headquarters started in the 1970s," said James C. Poole Jr., assistant manager of support services. Uncertainties introduced by the energy crisis and the oil embargo delayed those plans, Poole said, but by late 1980 they were moving again.

System design for the new headquarters shows the same blend of venturous conservatism that has characterized other corporate commitments at Alabama Power. In general, Poole said, building design was guided by a rule of flexibility, by the need to plan for change.

James C. Poole Jr., assistant manager of support services.

A unit called "the green box" will use off-peak energy during the night to make ice, which in turn will lessen energy needed for daytime cooling.

"Within conservative guidelines we've incorporated leading edge technology," Poole said. "It helps us use our generating capacity to its maximum."



Walter R. (Roy) Barron, manager of telecommunications.

Exploring Office Systems

As building plans matured, interest in computers intensified among support staff. Word processing and spreadsheet analysis were among the tools people wanted to help improve work efficiency. Their requests eventually reached the desk of executive vice president Elmer Harris.

"I was convinced that standalone systems were not the way to go in the long run," Harris said. "But the staff interest in improving effectiveness was so strong we decided to explore the whole area of office information systems."

Harris and Randy Hardigree, vice president, corporate planning, decided it was time for the company to install a pilot office information system to obtain data to help guide the effective infusion of this technology into the company's operations. A steering committee was

Elmer Harris, executive vice president.

appointed and asked to install a pilot system for about 25 people, most of them secretarial and support staff at the executive levels in the corporation.

During the summer of 1983, the committee sorted through the offerings of sixteen computer vendors, and tentatively decided to go with one of them. Barron and Mark Carter, MIS support manager, were scheduled to visit DECtown, an exhibition and demonstration of Digital's products in Boston's Hynes Auditorium. The committee agreed they would stay with their initial choice unless the Digital exhibit provided "overwhelming and convincing evidence" to go another route.

And they did find evidence. "It was simple," Carter said. "We were looking for integrated capabilities. Digital showed they could deliver what we needed."

The evidence proved to be as convincing for the rest of the steering committee. According to Randy Hardigree, vice president for corporate planning, "we had specified our needs fairly carefully. Of all the vendors, Digital met our requirements most closely."

Pilot Expanded

Even as the initial pilot was being installed, the steering committee was concerned about size and representation. They shared their concerns with Michael Blalock, Digital's sales representative. Blalock and his managers arranged for Robert McDowell, head of Advanced Office Systems at Arthur Young & Co., to visit with senior management at Alabama Power.

Mark Carter, MIS support manager.

"The meetings were challenging and productive," McDowell said. "I met with all the project participants. With Joe Farley, Alabama Power president, and his senior staff we had a chance to explore some of the wider implications of the project they were undertaking."

In the spring of 1984, Alabama Power engaged McDowell to help enlarge the pilot project, design measures to document use and savings, establish specific program objectives, and assist in extending the office technologies throughout the new headquarters building.

"Alabama Power is a rewarding company to work with," McDowell said. "There is a very positive attitude toward the project, throughout the company and at all levels. That attitude makes the whole process more productive."

The program now includes 120 people who represent a selected sample of the estimated user population in the company as a whole. The participants are distributed vertically, as well as horizontally, throughout the organization.

Measuring Reductions in Costs and Time

An essential part of the enlarged project included a 167-item survey of participants to see how they used paper, time, and telephone. The survey was supplemented by a three-week log to record actual time and usage.

The tabulated results of the survey will provide a benchmark for comparison with a matching survey to be conducted at the end of the pilot. But

Randy Hardigree, vice president for corporate planning.

the initial returns from the survey surprised everyone connected with the project.

"We must have set some kind of record," Roy Barron said. "We turned out to be more paper-intensive, more information-intensive than any other group they'd seen."

"It was startling," Bob McDowell said. "We tend to think of things like banks as paper-generators. But our survey showed, for example, that Alabama Power had more copy costs than any insurance company we'd seen."

One reason for the intense flow of paper and information through the organization is the public scrutiny with which a utility must live. Legal, accounting, and engineering departments within the corporation are constantly producing reports for regulatory agencies.

McDowell pointed out that the greater an organization's use of paper and data, the greater the potential savings with carefully designed and integrated office information systems.

"We've set specific objectives which are both challenging and realistic," he said. They include items like reduced costs of paper and time from memo production and document generation to freeing of floor space from reduction in file storage.

All participants in the pilot program received intensive training as appropriate for their workstation configuration. This training covered DECmate word processors, Rainbow personal computers, and the ALL-IN-1 office menu.

Paula Bryan, assistant to the vice president for human resources.

Paula Bryan, assistant to the vice president for human resources and a steering committee member, explained that grouping participants according to their experience with computers made training groups more efficient.

"We integrated installation and training," Bryan said. "The equipment for which people were being trained was installed while they were in training. We found there's less forgetting when people can get in there and experiment immediately with what they've just learned."

Immediate Savings

People who have used the system to alter the way they handle some of their projects are enthusiastic about immediate savings of time and energy.

"There's an agenda I'm responsible for preparing," Mark Carter reported, "and it used to take me five to six days a month. It typically went through at least three iterations, and then back for final typing in single space, and then out for manual distribution. The agenda almost needed an agenda. Now it takes me all of about 30 minutes in one day."

Some of the enthusiasm comes from the benefits of new varieties of information. The spot comparisons which have been used to compare corporate operating divisions can be skewed by random or unique events, Elmer Harris noted. They can now be replaced by trend-line analyses, which reveal more fundamental characteristics.

Clifford Capps, manager of management information services.

Shirley Thomas, a member of the steering committee, is executive assistant to executive vice president Jesse Vogtle. As a member of the first user's group she recalled that soon after the group began work, it became clear that the benefits of automation went beyond improved efficiency.

"People who work with paper find their time is better spent now," she said. "Because our work is more productive, we find that morale has been given a big boost."

Paula Bryan has found that the system makes working with data of various kinds much easier than preparing budget reports by hand.

"I spend 10 minutes at it now. I love it," she said. "Before, I figure with getting the data and doing the calculations and putting the things together and typing the final draft, I put in six to eight hours."

Some people have discovered a dimension of time savings they had not expected. Jim Poole's first test of the system involved an initial plan to spend a whole weekend to prepare an operational budget report in order to meet a self-imposed deadline.

"It was partly a personal thing," he said. "So I started work Friday afternoon around 3:30, and I was going to work Saturday and Sunday to get the thing done. To make a long story short, I finished the final report Friday around 5:30 p.m."

Changing the Way People Work

The hardheaded economies of time and money at Alabama Power promise to be substantial, but they are only the beginning. The company's vision is evident as people look to long-term changes in the very fundamentals of work.

James C. Poole Jr., assistant manager of support services.

"Telecommunications, office automation and data processing are all becoming one technology," Elmer Harris said. "Instant access to integrated information will change organizational structures and redistribute authority. Within ten years we'll see drastic change in how people work in an office environment."

For Mark Carter, "The terminal on a user's desk will become the fundamental tool, a necessity. Even now, as long as I stay within a Digital environment, I can get data from any accessible storage system, manipulate the numbers, add graphics, incorporate the text of a document, and distribute it over an electronic network," Carter said.

Clifford Capps pointed out that data definitions themselves are changing rapidly as the access routes become more integrated. "For example," he said, "it's no longer easy to say where 'office' information starts and stops. The definitions depend increasingly on the job you need to do."

The redefinition of data and the linking of databases raise new possibilities for long-range planning, according to Randy Hardigree. Statistical models of all kinds, such as those dealing with energy resources and demand, are essential to the work of his corporate planning department.

"The more data we have access to, the better models we can build," Hardigree said. "We're looking forward to linking databases so we have a pool comprehensive enough to take all needs into account."

In the meantime, the new headquarters building rises to take its place in the Birmingham skyline. A visitor asked Roy Barron whether planning for the move was on schedule.

"We are proceeding," Barron said, smiling, "with diligent haste." □

Walter R. (Roy) Barron, manager of telecommunications.

Changes Present a Challenge for Us All

From an interview with Robert McDowell

If office technology is going to result in real changes, then what does that mean to people who will feel the impact of those changes?

It means that they're facing a significant social challenge. If you accept my argument that change will happen—some jobs will go away, layers within organizations will compress—then people who have worked one way all of their professional lives must make the shift to doing things a different way, or perhaps doing different things. In my opinion, management has to obligate themselves to help employees through that process and, at the same time, look at their own environment.

That obligation works both ways. Employees have to be willing to change in order to expect support from their company. If someone is comfortable only when working the way he does today, then he is going to have a problem. If he is willing to change, then the company should be prepared to offer the support and training necessary to retrain him.

These changes can result in enhanced career opportunities for individuals—even create a new level of enthusiasm within an organization. But the organization must be aggressive and state how change will impact people and what commitment it has to help employees through the process.

What's going to happen to managers?

They're not going to disappear. There will be a compression in their ranks, because providing decision makers with better access to information should result in fewer layers. Office systems will not provide senior managers with tools to do things that others should be doing for them; preparing, manipulating and analyzing information will still be done by staff and support people. Advanced office systems will enable managers to increase their span of control. This may result in some reduction in the middle management group, but it certainly won't eliminate middle management altogether.

Do you think the organizational structure of a company will change?

Definitely. In fact, we're already seeing the impact of that. The issue quite simply is: "Who's going to control the information?" There is raging concern among some companies today regarding standard data processing requirements, telecommunications requirements and now, office automation requirements. Who's in charge of each and where do they belong? In many organizations there is so much tugging and pulling that it has had a significant impact on how cost effectively they can implement a new system. The organizational issue occurs in almost all of our implementations because management recognizes it as a problem and wants very much to deal with it.

Because people will have access to more information, will this have an impact on how independently they function?

Certainly having the flexibility to obtain information more easily will offer people an opportunity to make more decisions with fewer people and fewer steps involved. That's good. But be careful not to take the independence issue to the extreme. I certainly don't want a company of 1,000 people going in 1,000 independent directions! That's not the most efficient way to run a company.

On the other hand, I don't believe that information processing has to be so centralized and controlled that users must get in line and go through a series of prescribed steps to get what they need.

There has to be a balance. Certainly more autonomy is desirable, but a corporate view is also necessary.

What impact will these changes have on organizations' ability to compete with one another?

That's the bottom line. As I define the cost-benefit issue, we're talking about implementation of advanced office systems that will result in measurable benefit—change the way we work in such a way that it impacts the cost of operations. Obviously that suggests that the company will be more competitive if they reach their goals.

But without that cost-benefit approach, they can come up with more costly ways of doing what they're already doing. That will not make them more competitive. In fact, it could do quite the opposite. There is the potential for making some very large, expensive mistakes.

The real challenge is to apply technology in a way that is cost effective, provides an environment for people to change the way they work, is responsive to the organization's and the users' needs, and is effective in moving information throughout the organization.

It comes down to this. There's a way to use technology to the organization's advantage, but it takes commitment, planning, and considerable effort. Skipping any one of these will almost certainly result in a less competitive position rather than a better one. □

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