



## Human Resources at Hewlett-Packard (A)

At the close of 1992, newly appointed CEO Lew Platt sat at his desk pondering the state of Hewlett-Packard. HP's revenue had grown at an average rate of 15.3% over the previous five years, leaving net revenue at \$16.4 billion. Platt knew that HP was considered one of the best companies in the industry. Fortune Magazine's 1992 Corporate Reputations survey of the top Fortune 500 ranked HP #1 in the category of computers and office equipment, ahead of Apple, IBM, and DEC. HP's reputation in the business press continually rose with its sustained dominance in high-technology markets such as that of printers.

In his first months as CEO, Platt was confronted by a disturbing report from a task force appointed by his predecessor John Young. The task force cited several issues that needed top management attention. Their most alarming conclusion -- HP was losing its "human touch." During HP's early years, its founders, Bill Hewlett and David Packard, developed a number of management principles that later evolved into a set of corporate objectives, business values, and management practices known as "the HP Way." As a 26-year veteran of Hewlett-Packard with experience in several of its businesses, Platt felt strongly that the HP Way bestowed the company with a unique competitive advantage: highly competent employees who exhibited good teamwork and were committed to excellent performance. Had a decade of turmoil in its markets and organization damaged, perhaps irreparably, HP's source of success?

Besides this task force report, Platt contemplated a number of issues that would have to be resolved during his tenure as CEO:

- Could the feeling of many employees that the "HP Way is dead" be reversed and how? In particular, what should be HP's policy with respect to employment security, which many perceived to have been abandoned in the 1980s.
- Could the HP Way be applied in developing countries with very different traditions and cultures? Strong concerns about this issue by one of HP's business partners in East Asia had surfaced during the last three years of John Young's tenure.
- How much autonomy should HP allow its four major businesses in shaping their strategies, policies, and management practices? Far greater diversity in markets and products than had existed only a decade earlier resulted in pressure from the businesses to go their own way.
- Could HP avoid the failure that followed success in many high-tech companies? To answer this question, Platt needed to understand the source of HP's unusual success.

---

*Research Associate Gregory C. Rogers prepared this case under the supervision of Professor Michael Beer as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.*

Copyright © 1995 by the President and Fellows of Harvard College. To order copies or request permission to reproduce materials, call (800) 545-7685 or write the Harvard Business School Publishing, Boston, MA 02163. No part of this publication may be reproduced, stored in a retrieval system, used in a spreadsheet, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the permission of Harvard Business School.

The precipitous decline of once great computer companies like IBM and Digital Equipment Corporation caused Platt to pursue answers to these questions with considerable urgency. He began by searching HP's past for clues.

### **The First 40 Years of Business (1939-1979)<sup>1</sup>**

In 1939, Bill Hewlett and Dave Packard set up shop in a one-car garage in Palo Alto, California. Their first product was a new type of audio oscillator, an electronic instrument used to test sound equipment. By 1979, the number of employees had increased to 52,000, and company sales were at \$2.4 billion, based on more than 4,000 products: electronic equipment for measurement, analysis, computation, and printing.

#### **The HP Way**

Hewlett and Packard's strong beliefs in several areas shaped HP from its inception in the form of the corporate objectives:

Early in the history of the company, while thinking about how a company like this should be managed, I kept getting back to one concept: If we could simply get everybody to agree on what our objectives were and to understand what we were trying to do, then we could turn everybody loose, and they would move along in a common direction. [Dave Packard]

The objectives were first put into writing in 1957, and with minor modification they remained the most fundamental guiding forces at HP. (Exhibit 1 gives HP's description of these objectives.)

Underlying these objectives were HP's corporate values, a set of deeply held beliefs that governed employee behavior in meeting HP's objectives and dealing with their colleagues, customers, and shareholders. Not meant to be rules of behavior, the values were not formalized and written down until 1989 (see Exhibit 2 for a description of the values). Instead, they were espoused through everyday behavior and management processes that constituted HP's unique style of doing business. Through the years the values and objectives were credited with HP's successful growth and the strong loyalty and satisfaction expressed by its employees. The voices of people who worked at HP best captured the HP Way:

You said you don't think making printed circuit boards is much different here from other places; I think probably it is. People making PC boards here don't punch time clocks and haven't for the many years I've been here. They do have flexible work hours. They got them as soon as I did. They've got considerable freedom of input about how they are doing their job. They make suggestions for changes. They have every bit as much access to John Young [HP's president at the time] as I do. They don't see him as frequently, because they don't have as many reasons to talk to him. But the door is as open to them as it is to me. [HP Group VP]

Working at HP is about feeling the responsibility to express your opinion. It is about contributing as an individual while at the same working in a team. As a

---

<sup>1</sup> Many of the quotes in this section were taken from a 1982 case on HP written by lecturer Richard O. von Werssowetz and Professor Michael Beer.

result, there is an important value of trust and freedom at HP that employees need to work successfully as an individual and a team member. This inherent feeling within HP makes it a very special place to work. [HP manager]

#### *Participative Management*

The HP Way was difficult to define, both within and outside the company. It included a participative management style that supported--even demanded--individual freedom and initiative while emphasizing commonality of purpose and teamwork. According to this style, HP gave employees direction through well-defined, negotiated goals, shared data, and the support of necessary resources. Yet employees were expected to contribute to HP's success in their own ways. Individual performance to mutually agreed-upon goals was essential at all levels of the organization.

As HP grew, it tried to retain the sense of purpose, closeness, and informality it had as a small company. The policies and attitudes that fostered this style were all part of the HP Way.

The HP Way is a subtle way, and that is why we have so much trouble describing it. It is basically a faith in people to use their discretion and to be sure along the way to make some mistakes as well as to make some contributions. In a way that, over time, generally will continue to take the company in the direction it wants to go -- consistent with its basic underlying set of objectives. [HP manager]

The HP Way is difficult to explain because it's woven into the fabric of our organization. It's really about the inherent feeling that you just have to do the right thing for the company, the people, and the customer. It can take the form of teamwork, respect, or even just a smile. This doesn't change at HP. [HP corporate sales manager]

#### *Emphasizing the Process*

HP paid more attention than other companies to the *way* things were done, not only to *what* was accomplished. The *process* within HP provided the strength and structure that produced results:

You can't mess with the process. There's not a lot of flexibility in the way you use the process. The process has a very good track record, and people don't like you to mess with it. [HP group vice president]

If an employee does something that isn't in the HP style, people will say, "That isn't the way we do things around here." [HP program manager]

#### *Developing New Working Relationships*

Trying to engender a common, supportive process while retaining individuality required exceptional subtlety, trust, and openness in relationships. These, too, were part of the HP Way. New employees often found this quite different from their prior experiences:

I thought: These people are putting me on. Why, there's not a shop in the world where someone isn't bad-mouthing the management. So it bothered me that no one was saying anything really bad about HP. I still can't say I really understand why it works, but it does. Peer pressure has something to do with it.

New people with bad attitudes quickly learn that it's not acceptable to be that way at HP. [HP model maker]

We hear about the "HP Way" almost ad nauseam. It's sort of "truth, justice, and the HP Way." I went through a real struggle with the concept. Initially exposed to it, I thought: Boy, there's an awful lot that makes sense. But I guess I came to the point where I said this is overindoctination. Some of it must be baloney. I've come not quite full circle but partway back to the realization that, gee, there is an awful lot that is distinctive and good in the "HP Way" that as an employee I feel grateful for. [HP employee of one year]

## Business Strategy

HP's products in its first thirty years consisted mainly of electronic test and measurement instruments for engineers and scientists. The company then expanded into computers, calculators, medical electronic equipment, instrumentation for chemical analysis, and solid-state components. Even so, HP was still a test and measurement business up through 1979. Sales had grown at a compounded rate of 23% over the previous 10 years while net profits had compounded at 27%. Having expanded globally from the beginning, HP had 20 manufacturing locations in the U.S. and 8 others around the world. There were over 60 U.S. sales and service locations and over 100 more in 64 other countries. HP's sales were split about evenly between the U.S. and the rest of the world.

Up through the early 1980s, HP succeeded more through technical innovation than by marketing or other means of competition. During that time, HP's main customer was the engineer. Thus, the research and development function was dominant. Because HP engineers developed products to serve people like themselves, marketing was not valued and was relatively weak, as were logistics and distribution. This strategy reflected the no-nonsense approach of HP's founders. HP concentrated on modestly sized market segments where its technically superior products could achieve a strong position and command high margins.

## Organization

A highly decentralized organizational structure enabled HP's strategy. The fundamental business unit was the product division, and its general managers were authorized to make decisions for their business:

The division. . . is an integrated, self-sustaining organization with a great deal of independence. The aim is to create a working atmosphere that encourages solving problems as close as possible to the level where they occur. To that end, HP has striven to keep divisions relatively small and well defined [1982, "The Hewlett-Packard Organization"]

No product area was a division until it contained the six basic functions of R&D, manufacturing, marketing, quality assurance, finance, and personnel. (Advanced fundamental research was performed by the corporate R&D group, HP Labs.) New divisions were created by a process similar to cellular division: "New divisions tended to emerge when a particular product line became large enough to support its continued growth out of the profit it generated," said a general manager. At the end of 1979, there were 40 HP divisions, and general managers were held accountable for results. Underperformance was not tolerated, but managers were typically transferred rather than fired.

Coordination of division activities was the responsibility of 10 product groups, each accountable for the overall operations and financial performance of its members. All sales organizations reported at the group level, as did some nondivisional manufacturing operations.

A corollary to the strong, relatively autonomous divisions was the moderate size and influence of the corporate staff. The special cross-divisional projects that other companies assigned to corporate staffs were given to ad hoc task forces drawn from many parts and levels. For example, the corporate personnel function was initiated only in 1957, when HP had 1,200 employees. Dave Packard said, "When the company was much smaller, quite small, I didn't think we should have a personnel department, because I thought personnel should be everybody's responsibility, and I didn't want to have someone they could pass the buck to."

### **Business Policies**

HP's policy of self-financing its growth resulted in minimal long-term debt. The only loans taken were to finance its international operations. Packard articulated this underlying philosophy:

Now in some industries, particularly those which require large capital investments, the pay-as-you-go approach is not feasible. There is also a school of thought in management that capital needs should be attained by leveraging your profits with equity financing. This school of thought says you can make your profits go further if you do this. Now whatever the arguments, it is not Hewlett-Packard policy to lever our profits with long-term debt. We want every manager to know this and to act accordingly. . . . I see no possible circumstance that would justify a change. You can argue if you want to, but it isn't going to get you very far.

To help support growth under these conditions, HP focused on the management of assets, particularly receivables and inventory. This included establishing close working relationships with vendors and using computer information systems to help pinpoint problem areas. There was a constant evaluation of the relative merits of increasing capacity by adding new fixed assets versus introducing new production equipment in existing facilities.

The financial reporting system enabled evaluation of a division's domestic and worldwide performance. The adjusted worldwide profit and loss statement was the basis for allocating each division's R&D funds – historically 9% of sales. This system rewarded innovative divisions with additional funds for further innovation and acted as an indirect form of asset allocation.

HP's self-financing policy was intended to support its human resource philosophy and policies, particularly employment security. Although employees could be fired for poor performance, HP never laid off anyone even when its profits suffered in an economic downturn. For example, during the 1970 business downturn, when electronic companies across the U.S. were laying off employees, every HP employee took a 10% pay cut and worked 9 out of 10 days, taking every other Friday off. There were no layoffs.

Its commitment to its employees also led HP to avoid contract business. HP generally designed technically superior general purpose devices suitable for a broad range of customers. Its focus on technological contribution led HP to conclude that it was not appropriate to try to gain market share with low introductory or forward pricing.

## Work Systems

### *Management by Objectives*

The activities of HP employees were guided by a comprehensive system of management by objectives (MBO). It began with the establishment of long- and short-range objectives, derived from company and group objectives. At each company level, overall objectives were communicated and subunit objectives were negotiated.

Objectives were goals, not tasks, and provided much freedom in how the goals would be accomplished. The goals were also made to mesh horizontally and vertically throughout HP. The entire MBO process was part of annual tactical and strategic planning that defined a job's objective and its major responsibilities and performance measures.

Although MBO was initiated from the top, the iterative nature of the MBO planning cycle provided ample opportunity for individual initiative and influence in setting overall objectives. Employees were expected to suggest ways they could help attain the unit's goals in order to create individual accountability. Bill Hewlett described the underlying philosophy of MBO:

MBO says that a manager, a supervisor, a foreman, given the proper support and guidance (that is, the objectives), is probably better able to make decisions about the problems he/she is directly concerned with than some executive way up the line, no matter how smart or able that executive may be.

This system places great responsibility on the individuals concerned, but it also makes their work more interesting and challenging. It makes them feel that they are a part of the company and can have a direct effect on its performance.

The MBO system was also viewed as the main control system over the product divisions, which some described as "feudal baronies."

### *Commitment to Teamwork*

Maintaining openness, trust, and cooperation was fundamental to the HP Way. Speaking in the late 1970s, Dave Packard said:

One of the things we have tried to achieve, and I think have achieved thus far, is this concept of teamwork. The only way this company is going to run successfully is if we can ensure that there is a maximum flow of information and cooperation between all the elements of it. and this is a very tricky situation.

I've often expressed this in terms that everybody in the company is equally important. It's just as important that the fellow responsible for sweeping the floor does a good job as that Bill and I do a good job. In the type of work we are doing it's the little details that will make the difference between a good-quality product and one that isn't very good. So what we've tried to engender is this attitude that it is everybody's business to do a good job.

Teamwork was practiced within divisions between R&D, manufacturing, marketing, and finance. In addition to being utilized in the MBO process, it was encouraged through a wide variety of communication devices and a philosophy of participative decision making.

Teamwork was required and exhibited in cross-divisional coordination of selling activities. In 1980 a marketing vice president stated: "Many of our customers, especially major accounts, needed products and service from two, three, or more product lines. So there had to be a lot of interaction

between the salespeople servicing these customers. They had to work together as a team, using common sense as to who should lead the team."

## Communications

### *Open Door Policy*

HP used a variety of techniques to encourage an ongoing dialogue with its employees. Almost all individual offices had no doors. Work areas were usually wide-open spaces with rows of open carrels. Top executives had modest-sized offices within large administrative areas, divided only by freestanding, low partitions:

When I first came to HP, I started to wonder how I was going to get any work done with people going by my office and telephone conversations going on around me. But I got used to it. It's really about creating a learning organization. If something becomes an impediment, it soon becomes common knowledge. In the same way, best practices are widely talked about and spread around the organization. [HP manager]

A supervisor is expected to promote an atmosphere wherein an employee feels comfortable and free to seek advice and counsel regarding problems of either a personal or job-related nature. The employee may seek counsel from a supervisor, member of the personnel staff, or any level of management with the assurance that no adverse consequences will result from responsibly raising issues with management or Personnel. [HP Personnel Policy Manual]

This formal policy was a last resort to guarantee any employee's access to any other. Much more important was the continual day-to-day mixing of employees at all levels. Common coffee breaks were a ritual, with HP providing coffee and donuts to all employees every morning and afternoon. There were also frequent plant meetings to discuss the latest company and plant news. A loudspeaker system allowed executives to announce company operating results and discuss topics of wide concern. At periodic "beer busts" and picnics, managers usually cooked and helped serve other employees. Moreover, management meetings, retirement parties, and division parties often included skits that affectionately caricatured management foibles and mannerisms, thereby helping demonstrate the humanity of important managers and increasing the feeling of approachability (besides being a lot of fun). All of these practices were meant to reinforce a sense of common purpose and belonging and widen employee sources of information.

In addition to the *ability* to seek advice from anyone in the company, there was the *expectation* that those who could contribute would be sought out:

I guess one of my first reactions was seeing how many people I had to check things with before I went ahead and did something. And it wasn't the tone of saying, "Look, you have to get their approval." It was more like, "Here are some people who probably have something to say about what you're doing. You really ought to talk to them." It was that kind of subtle difference, but it really ended up in getting approval. [HP engineer]

### *Management by Wandering Around*

Managers at all levels were encouraged to spend part of each day wandering through the organization, even if only to see what was going on and to build new channels of communication with other employees. Management by wandering around (MBWA) was attributed to John Doyle,

an HP vice president in the early 1980s and was spread through company publications, meetings, training sessions, and by the example of upper management:

It seemed to John that there had to be a way of describing the extra step HP managers needed to take to make the HP open door policy truly effective. It was not enough to sit and wait for people to come through the door with their problems and ideas – they probably wouldn't in many cases. The managers had better get off their chairs and go out and get in touch with people. In that way, people would know the managers were accessible whenever they had something important to communicate.

Straightforward as it sounds, there are quite a few subtleties and requirements that go with MBWA. For one thing, it's not always easy for managers to do -- so many of them do it reluctantly or infrequently. And its purpose is not always apparent to people, especially new HP people, at the receiving end of visits, so they may view it suspiciously. [Excerpt from HP company magazine]

#### *Division Reviews*

MBWA by high executives was coupled with another communication device in the form of division reviews:

Division reviews are the natural outgrowth of HP's personal interest and hands-on style. They cover a full range of business matters: financial performance for the past year, outlook for orders, shipments, and facilities for the next three years, detailed presentations on product development strategy, key programs, and very importantly, a look at people management, including training, recruiting, and affirmative action goals and results. A very broad cross-section of the division personnel is involved in organizing and presenting reviews. This is an excellent forum to become acquainted with the growing numbers of people who are key to the success of all these programs.

The visiting group of reviewers shifts a bit depending on location and schedules but generally includes several members of the executive staff, heads of corporate staff departments such as personnel and controller, appropriate group managers, and usually [other] division managers with special interest in the programs. With all the top policy originators and implementors in one place at one time, the usual communication paths are short-circuited, and we can focus on results. [Former CEO John Young]

Hewlett or Packard, themselves, very often visited a site to take part in the review process. They spent part of their time during such visits practicing MBWA to foster closeness within HP and to acquaint themselves with new employees.

#### *Attitude Surveys*

HP conducted periodic surveys to learn about employee attitudes and concerns. The results of a 1979 survey demonstrated the strong bond the company had forged with employees (Exhibit 3). The company always published results and provided its interpretation and planned responses. The 1979 survey results were summarized in the company magazine:

From their responses to the [survey] questions about personal identification with the company, it's clear that HP people like working at HP. Some 93% said they would recommend HP as a place to work, and 83% actually said they feel personally responsible for contributing their share to HP's success. Overall, their



identification with the company is 25% above the national norm -- a figure survey specialists saw as extraordinarily rare and even "mind-boggling."

## Promotion and Reward Systems

### *The "Career Maze"*

Employees referred to career paths at HP as "the career maze." This phrase acknowledged the normalcy of cross-functional and cross-divisional promotions and lateral moves, based on performance and potential, that often occurred over the course of a career.

There is no prescribed career development or progression pattern. In a lot of companies, you can sit down and literally do a flow chart. If you want to get to point F, you do A, then B, then C, then D and E, and you're ready for F. You can describe each job. It's not at all true in this company. When it comes time to promote, we try to look for the best people. There are many examples of unusual progressions at HP. There are many paths you can follow to any particular end. For example, in my first eight years, I guess I had about seven or eight different jobs and four different functions. A couple were lateral moves; some were promotions. It's not necessary to get a bigger title or to jump a level in the pay system to be given new responsibility. I feel very positive about that. [HP manager]

Not only did HP believe this was the best use of people, but the constant fertilization across functions helped coordinate the design, manufacturing, and distribution processes. This attitude toward promotion, however, required different mechanisms for identifying candidates since the candidates were often not within the same area or along the same preparation path. Some of the devices mentioned earlier played an additional role:

There is a lot of very purposeful mixing of people. One way is through the division reviews process. In addition, we spend a fair amount of time talking to people, having communications luncheons, things like that. There are a fair number of social and quasi-social gatherings like the beer busts and picnics.

We use a lot of task forces. It's an important vehicle for getting things done. It's a way we get along with a relatively small staff. We sometimes call this real people involved in solving real problems. First of all, it gets work done. As a matter of fact, it is a very, very important part of the way we do business. But it also gives a lot of visibility to people. [HP group manager]

### *Pay and Performance*

HP managers invested considerable time and energy ensuring that an individual's pay level within their salary range reflected their performance when compared to others. Performance was judged by the immediate supervisor but adjusted based on a ranking process, conducted by managers in face-to-face meetings, which compared employees in different departments with similar responsibilities. (This process was slightly modified in 1994 to limit checking across departments for only those at the high and low ends of the distribution.)

Individuals whose performance was ranked in the top quartile, for example, were given larger and more frequent raises, occasionally more than one a year, so their salary would rise to the upper quartile of their salary range more quickly than that of lower performers. Because the ranking was based on *sustained contribution*, sudden dramatic changes in performance position were rare. Those whose performances had declined were given small or no increases. Constant placement

in the lowest quartile resulted in job counseling and quick improvement, repositioning, or involuntary termination. In contrast, efforts were made to promote the highest performers.

The company went to great lengths to build an egalitarian atmosphere of rewards beyond salary. Executives didn't have the usual privileges of position like enclosed offices (though by 1992 a few top corporate executives had modest, glass-enclosed offices). Nor did they have special executive incentive plans. *All* employees were on the same profit-sharing plan and were eligible for stock options. There were no annual executive performance bonuses, though the total compensation of HP executives -- through higher salaries -- was competitive with the industry. The share of profits was the same percentage of pay regardless of level, but no one contended that the stock options should be the same for everyone -- that was a function of contribution.

## **Employee Selection and Socialization**

### *Hiring*

The very best technical skills, interpersonal skills, adaptability, and cultural fit were key criteria for selection. HP's high selectivity was widely discussed to help instill a sense of pride in the work force at all levels. Hiring was accomplished by traditional multiple interviewing processes in which applicants were asked how they would approach a problem rather than just what knowledge they had. Testing was rare and limited to specialized skills tests particularly to a position.

In 1982, an HP manager stated: "It starts with the hiring decision. Everybody we hire, we hire forever. At least that's the basic premise. We are not hiring anybody for a program or for specific short-term skills. Given our basic objectives of promoting from within and growing our own managers, supervisors, and technical people, we look for people with a lot of growth potential."

Because of the feeling that the culture of HP was different, it was unusual for someone to be hired into a manager's position:

Now there are some who say that a person is a good manager who has mastered managerial techniques; he can manage anything. Well, maybe he can. But I hold very strongly that he can manage it a hell of a lot better if he really knows the territory. [Dave Packard]

It would be quite rare that you could come right into a management position new to the company and handle it. You're really not trusted or known for at least the first year. It takes you that long to kind of go through the receiving line if you will, or just become part of the group, because it is so subtle and there's so much that needs to be handed down like tradition. [HP employee]

New employees at all levels tended to go through a period of adaptation that often included considerable frustration with the HP style:

There's a conditioning period for people who have worked other places. Maybe it's the informality they see or the nondirectiveness of HP. Instead of your being told point by point what you're supposed to do, your boss is relying on you to be able to use your head. I think maybe that's sort of frightening to some people. [HP employee]

*Passing on the Company Lore*

One of the most important tools for conveying the HP personality was the telling of company stories. The following were some of the most common stories known by most HP employees:

- How Bill and Dave (as Hewlett and Packard were commonly addressed) started the company with \$538 in the garage behind the Packards' rented house.
- How Dave Packard smashed up an instrument in a laboratory one day because he thought it was poorly designed, unreliable, and generally a "hunk of junk."
- How Bill Hewlett challenged HP Labs to build a scientific calculator he could put in his shirt pocket, which led to the introduction of the world's first small scientific calculator and one of HP's most important business segments.
- How the need for a contemplated issue of \$100 million in long-term debt was avoided in 1973 by a tough, corporatewide concentration on asset management.

Stories like these were highlighted in recruiting and orientation of new employees, recalled during management meetings and retirement parties, used as the subjects of articles in the company magazine, and incorporated into speeches and letters from Bill, Dave, and other company leaders.

During the first half of the 1970s, rapid growth and hiring led to formal training in the values and practices of HP. It became more difficult to pass the culture on by example and word-of-mouth. This led to a course called "Working at HP" and later "Managing at HP" for new managers. These courses were presented in modules and included presentations from line managers, typically the general manager at that location.

## **The Turmoil of the 1980s**

Hewlett-Packard's businesses and organization were severely challenged in the 1980s. As its computer business grew in revenues and profits, the company was subjected to forces buffeting that industry since the early 1980s: rapid innovation in information technology, entry of new startups, declining prices, global competition, and resulting outsourcing. Though it continued to grow, HP's profits did not keep pace in the late 1980s, causing its stock price to languish and employee profit sharing to decline.

While some of its management policies and practices were challenged and changed, employees perceived the most wrenching change in HP's employment security policy. A downturn in the electronics industry in the mid-1980s and dramatic cuts in defense spending (which HP's test and measurement business heavily depended on) triggered a period of retrenchment. At first the 1970 strategy of a nine-day fortnight in which every HP employee took off every-other Friday was tried, but management quickly realized that performance problems this time were a function of more than just a downturn in the business cycle.

To reduce costs and avoid layoffs, HP instituted two new policies: downsizing and redeployment. Downsizing was driven by an analysis of future business needs and was accomplished through early retirement packages and voluntary severance incentives. When chosen for redeployment, employees were given three paid months to find another job within HP. If they were unsuccessful at doing so, HP found one for them anywhere in the company, if necessary at another location and/or at lower pay. If the employees did not accept the new job, then they would

have to leave the company with a severance package. Employees with the least amount of seniority were the first to be redeployed.

Employees were emotionally shaken. HP's goal had always been to provide "employment security" for its people. Because the test and measurement industry in the 1970s was relatively stable, many employees came to believe, however, that employment security meant *job security*, a guarantee of a career in one job or organization so long as they continued to perform. This perspective changed quickly though as HP continued to downsize and redeploy in anticipation of competitive trends, not just in response to performance problems which triggered the process initially. An employee captured why HP's people were upset:

During the first instances of downsizing and redeployment, many of us couldn't believe that it was happening. There had been a belief through the years that as long as you continued to perform you could keep your current position with the company for life. Granted, all of HP's employees really appreciated the company's strong desire to avoid layoffs. But at the same time, the people who were redeployed to different parts of the country felt like they were being forced to move to a cousin's house in order to remain in a family that they had been a part of for so many years. It just made for a different feel in the company.

Employee satisfaction as measured by company surveys decreased steadily through the 1980s, and the 1992 survey results did not show much improvement (see **Exhibit 4** - The 1992 categories differ slightly from those in the 1979 survey shown in **Exhibit 3**). Because he viewed HP's people as a source of competitive advantage, Lew Platt was dismayed by these results:

Employee satisfaction is a critical issue for HP because if we don't remain the employer of choice, sooner or later everything that's great about this company is going to go away. If you don't have the best people, and if they are not highly motivated, then everything else you are working on just gets to be harder and harder. There are a lot of ways to manage a company, but I believe that HP's primary source of competitive advantage is to create the kind of environment that supports its people.

Convinced that one of the fundamental strengths of the company lay in its people, Platt was eager to turn around the precipitous decline in employee attitudes and to respond to the task force's concern that HP was losing its human touch.

## **HP's Entrance into Computers**

Change in the business environment was the main cause of difficulties HP faced. In the early 1970s, management realized that general purpose computers with tailored software could provide an alternative to specialty instrument functions. They believed that test and measurement engineers would soon want this powerful computational option. Thus, HP entered the new market in 1972 by introducing the first hand-held calculator and then, in 1974, a minicomputer. Fiscal year 1980 marked a turning point: it was the first year that computer products at HP eclipsed its test and measurement instruments in earnings (\$285 vs. \$271 million, respectively). Expansion into new product lines ensued with the entrance into personal computers and peripherals.

By 1992, HP had grown considerably. Besides its traditional instrument businesses, it now had two computer organizations: the Computer Systems Organization (CSO) and the Computer Products Organization (CPO). The latter dealt in high-volume products such as PCs and printers; the former operated in the higher-margin businesses of workstations and minicomputers. Market

conditions for both computer products and systems demanded price competition and high speeds of innovation. (These conditions existed in an extreme for CPO).

Six hundred sales and support offices and distributorships were located in over 100 countries with approximately 58 divisions worldwide. Sales stood at \$16 billion after having grown at a compounded rate of 15.4% over the previous ten years (see Exhibits 7, 8, and 9 for a 10 year earnings summary, balance sheets, and sales by similar products and services). International business accounted for 56% of revenue. Computer products produced 77% of HP's income, up from 54% in 1980. The transition into computers enabled entry into new, fast-growth, high-potential areas, but it also meant that HP had to adjust its traditional strategies and policies.

#### *Changes in Business Strategy*

In a fast-paced computer industry, particularly for consumer-oriented products such as HP's PCs and printers, technical innovation could no longer be the sole source of competitive advantage. Speed to market, price, service, and distribution became just as important. Marketing, not highly valued in HP's first four decades, became critical. In the past, HP's marketing was done by its engineers through what was called "the next bench syndrome." They discovered what customers (test and measurement engineers like themselves) wanted by figuratively looking over to the work bench next to them and observing what their coworker needed. Now sophisticated understanding of and responsiveness to a much more diverse set of customers were necessary.

HP's entry into this new environment started in its computer systems business. Throughout the 1970s and the better part of the 1980s, both IBM and DEC built proprietary computer systems, starting with mainframes and then moving to minicomputers and desktop workstations. HP, then much smaller, also took this path until one of its computer divisions decided the future lay with "open systems," where customers could mix and match compatible hardware and software products from many vendors rather than only one. Thus, in the mid-1980s, HP committed part of its computer production to a nonproprietary operating system developed by AT&T called UNIX.

HP's open-system computers competed directly with IBM, DEC, and HP's own proprietary systems, but its investment in UNIX paid off as customers started to see the advantages of such systems.

That we didn't have a large market share to defend turned out to be very lucky. When you go for market share against entrenched players, you better figure out a different tactic than to take them head on. So we looked at the technology and saw the future in open systems. This turned out to be a very important historical lesson for us because we found out what happens if companies become complacent and blinded by their own success. [HP vice president]

HP also invested heavily in developing a new computer architecture called Reduced Instruction Set Computing (RISC) for its mid-range computers and later its workstations. It used a specialized chip that allowed faster computational times with reduced instruction sets. It competed against HP's older computer chip and those of its competitors. Others in the industry did not foresee the future moving in that direction and publicly referred to it as "HP's RISCy decision." HP's bet paid off by the early 1990s, however, when RISC became the industry standard.

In the past test and measurement business, major new products every two to three years provided the needed edge over competition. In 1979, about half of HP's sales came from products introduced within the past three years; in the 1980s, this was no longer sufficient. Competition in the computer industry forced rapid introduction of new products that were often slight variations on the old.

HP's printer business was the quintessential example of this strategy. Although it didn't introduce its first PC printer until 1984, HP dominated the printer market by the end of the decade. A general manager remarked in the company magazine, "Despite their success, they [the printer business] live every day in fear that success can go away very quickly. They are highly motivated to maintain an obsessive focus on customer needs as well as what the competition is doing." This focus led HP to introduce inexpensive, high-quality ink-jet technology in 1987. As was the nature of HP's products, the ink-jet printers competed against the company's already highly successful laser printers but even more so against the inferior dot-matrix technology of the time.

By the early 1990s, necessity had forced HP to embrace a philosophy of introducing new products that competed with their existing products. Slightly more than 50% of HP's orders in 1992 were for products introduced or revamped within the past two years. This was up from 30% a decade ago.

We seem to be able to sacrifice our current business to a certain extent to get into new opportunities. We don't worry about it too much. I mean, we do soul search, wondering what a certain product will do to our current product line. The important thing is that we seem to be able to make this leap forward better than our competitors. [HP corporate sales manager]

By 1992, the further decline in defense spending led to performance problems in the test and measurement business. Ned Barnholt, its new leader, faced many of the pressures that had severely tested HP's computer businesses.

#### *Changes in Business Policy*

HP's decision to become a major competitor in computers came at a price. Because it started out in test and measurement, HP lacked some of the knowledge necessary to succeed with computers, especially workstations. Therefore, it relinquished its tradition of avoiding acquisitions and partnerships so it could obtain expertise for future growth. Acquisitions had been avoided in the past for fear that HP's culture would be diluted, but in May 1989, HP made its largest acquisition when it purchased Apollo Computer for \$500 million. The purpose was to gain Apollo's expertise in workstations and its broad customer base. (The purchase was made completely "out of pocket," for HP was not ready to break from its value of pay-as-you-go.) Lew Platt commented on this shift toward alliances:

Today we are forced, because of intense competition, to do a few things well and look to partners to do other things for us. We're forging alliances. It used to be that if you named the company, I could tell you what our relationship was with them. Not anymore. I'll wonder, "Do we compete with you or are you our partner? I'm not sure." As I've already said, everyone is expanding their international activities, and it really takes a whole new set of strategies to survive today.

HP had to sacrifice other traditions as well. It began to do contract work, for HP now had a big enough revenue base that a lost contract would not affect its employees significantly. Because market share became critical to success in the computer industry, particularly in the consumer end, HP was forced to abandon its previous avoidance of forward pricing. In its computer business, forward price was practiced as long as the gain in market share would ultimately add to profit or knowledge.

Competition also forced HP to consolidate and outsource, both measures coming in the wake of a 1987 initiative to focus on "core competencies." These were areas of skill or knowledge in which HP thought it held a competitive advantage. Areas not considered "core" were outsourced to other

companies; activities that were core but in different locations might be consolidated. HP's company magazine wrote, "At one time, HP even made all its own screws -- and they were the best screws in the world. Then the company decided that making screws, even superior screws, was not a core competency it had to have." In order to remain competitive, HP found that it could no longer retain its long held not-invented-here sentiment.

Acquisitions, consolidation, and outsourcing created dislocation that employees felt degraded the solidarity of the company:

For me, the greatest loss (as a result of outsourcing) is the sense of "HP family" that we had. The employees -- whether engineers, production staff, security guards or secretaries -- all felt connected to each other and the company. Today we have a stratified work force where regular employees are haunted by the fear of becoming "one of them" -- the workers without benefits or loyalty. [Excerpt from an employee letter in HP's magazine]

Other employees feared for the future of their jobs as they saw coworkers being redeployed to different parts of the country. One employee published a letter in the company magazine to warn his colleagues about complacency:

I've worked in manufacturing at HP for more than 16 years and been through three product closures that each time sent me looking for another job within the company. This closure is different. The product didn't become obsolete. It wasn't replaced by another product. It will still be built; it just won't be built in this country. . . . The trouble is, I can't argue with the direction our managers have taken us. The company appears to be making the right moves. . . . (However), if I could write a letter today and magically have it delivered to myself two years ago, I would warn myself not to be complacent.

Because of downsizing and redeployment undertaken to accommodate lower margins, outsourcing, and consolidation, HP never had to institute a companywide layoff. In fact, the only layoffs that did occur were a result of acquisitions in which some employees from the acquired companies could not be placed within the HP organization. Nevertheless, many employees did not perceive it like this, and their voices raised important questions. Had abandonment of long-held business policies damaged HP's unique relationship with its employees? Would it damage HP's capacity to compete in the long run?

## The Organization

Consolidation also had an impact on the structure of the company. Many divisions no longer had all their own functions and instead shared them, most notably manufacturing sites. The HP division, a "feudal barony" in the first four decades of the company's existence, was no longer the rule. This was especially the case in the Computer Systems Organization (CSO), where coordination across divisions was essential. All the different systems of the computer (ie. the terminals, displays, circuit boards, and CPU) had to be integrated. CSO's separate divisions working as autonomous units did not produce this necessary integration very effectively. Thus, CSO consolidated manufacturing and other activities to achieve coordination and cost efficiency but maintained a decentralized product marketing focus to remain responsive to customers.

The divisional organization was changed in all parts of the company, but in different ways depending on the needs of the business. The fundamental business unit was no longer simply the

division. In many of HP's businesses, particularly CSO, the level of autonomy had moved up to the group level. Lew Platt commented on this shift:

In the past, we used to say that you could take a pair of scissors and clip a division out of the organization chart, and it could be a stand-alone company. That is really not true anymore. You now can see a lot of shared services at the group level.

Despite structural changes forced by a new business environment, HP still valued decentralization. This philosophy was thought to enhance entrepreneurship and accountability. HP's printer business was the best proof of this. It was started by Dick Hackborn in Boise, Idaho, away from Silicon Valley in order to assure autonomy from the rest of the company. Top management attributed its tremendous success, in a low-margin consumer business very different from HP's traditional technical businesses, to the fiercely competitive, small business atmosphere that Hackborn and his successor had developed.

Mistaken efforts in the 1980s to obtain coordination through centralization reinforced management's commitment to decentralization. According to many, two major organizational changes were responsible for HP's poor performance in the late 1980s. In 1983, the company formed the Computer Strategy Council to establish a long-term plan to move into open systems and beyond. One year later in 1984, the computer and instrument sales forces were merged to improve coordination of selling to major customers by these two disparate businesses. Managers agreed that the Computer Strategy Council had spawned a bureaucracy that slowed decision making to a crawl while reducing focus and accountability. The decision to combine sales forces, made uncharacteristically with the help of a renowned management consulting firm (HP had traditionally avoided using management consultants), reduced specialized expertise needed to sell the very different instrument and computer product lines. Consequently, by 1987, the sales forces were re-separated. Furthermore, in a 1990 reorganization, the Computer Strategy Council and its committees were disbanded, and the company's computer business was separated into two distinct business organizations, the Computer Systems Organization and the Computer Products Organization. This change produced a more focused and decentralized four business organization within HP (see Exhibit 6 for a description of HP's major business organizations).

As HP's business organizations (Test & Measurement, Computer Systems, Computer Products, and Measurement Systems) grew in size and power during the early 1990s, they tended to operate more autonomously from each other (Exhibit 5 for the organization chart). They no longer shared many common services, now having different customers, structures, technologies, and channels of distribution. In addition, due to the 1990 reorganization, they had obtained direct line responsibility and authority over strategy, marketing, selling, and operations of overseas businesses from the international division. Though HP's business leaders urged greater autonomy for their businesses, other voices argued for more cooperation and coordination.

Joel Birnbaum, head of HP Labs, argued that HP's core competence lay in its mastery of technologies that enabled the functions of measurement, computation, and communication. He articulated his vision through the equation "HP=MC<sup>2</sup>." Birnbaum believed that HP's future lay in synthesizing these technologies and integrating the diverse business organizations that supported them.

As a result of HP's strong worldwide product organization, foreign country managers, once powerful, no longer had direct influence over the various businesses in their country. Their role in 1992 was to represent HP and maintain compliance with local laws, although many retained line responsibility for running one of the businesses. One country manager saw himself as a lone voice in his country organization for coordination across businesses, common purpose, and the HP Way. Top



executives also experienced demands from the businesses to operate more freely from the larger organization. The company faced the dilemma of choosing between the benefits of decentralization and the costs of lowered coordination, particularly around common technologies and customers, and shared values and practices

With its ever-increasing international presence, HP opened new offices throughout the world. One of the main concerns when starting a new branch was how well the HP culture would be transplanted into that part of the world. Throughout most of its international offices, the HP Way had been adopted quite readily. However, there were times when the company's fundamental values, such as trust, participative management, and respect for the individual, clashed with the culture of the host country. For example, when HP set up a joint venture with Samsung in Korea in 1984, it found that the HP Way contradicted many of the values found in a Korean company: strong hierarchy, homogenous staff, little open communication, and no guarantee of due process through a formal, open-door policy. Samsung's concerns led to a request in 1989 that local management practices become the norm in the Korean joint venture.

### The HP Way

As HP's environment shifted, some of its traditional ways such as the process by which teamwork was employed, started to change. In the past, for example, employees believed teamwork mandated consensus, but according to one executive, there was not always time for consensus in a rapidly changing environment:

Is it the HP Way to only do consensus decision-making? The business answer is no. It's not the HP Way to only have a consensus decision-making process. However, once a decision has been made, it is the HP Way that everyone supports that decision into implementation whether in agreement or not. In the past, I think people interpreted the HP Way as having to gain consensus on every decision. That just can't happen now in such a fast paced environment. [HP executive development manager]

Traditional communication practices were also affected by the faster-paced work environment. In the past, a bell would signal that coffee and donuts were served, and employees would gather around to talk with one another. As people's schedules tightened and deadlines shortened, employees could no longer take scheduled breaks during the day. Instead, coffee was made available all day long (donuts were no longer served due to cost cuts). In order to replace the coffee break tradition, "coffee talks" were given a few times a month. Employees were expected to come to these meetings to hear about current HP issues.

Tighter schedules were partly a function of HP's downsizing and subsequent conservative hiring practices. These often left fewer employees to deal with the agenda of a growing company. This, too, affected the HP Way:

We've had a lot of downsizing here at our division. And that means a lot of us are having to do more of the job because we have a high value to get things done as they used to be done and still doing a good job. As a result, we have less time and more pressure upon us, so we sometimes may not take the time to do the little HP Way things that make this a special place to work. [HP employee]

Management by wandering around (MBWA) was viewed as one of the practices most affected by a high-pressure environment:

I just don't have as much time to dedicate to MBWA. But I realize that it's really important and do my best to fit it into my schedule. Many of my colleagues are forced to turn to other methods to practice MBWA such as e-mail and teleconferencing, especially to reach international employees. . . I am not sure whether such methods are as effective as the traditional "wandering around," but with the changing environment, we do what we can to show that we care about employees. I think that is why you still see a tremendous amount of commitment and caring for the organization throughout the company. [HP manager]

The personal nature of division reviews changed slightly as well. In the past, each division would be reviewed individually, many times with Bill Hewlett and Dave Packard present. The larger number of divisions and increased emphasis on the group, however, precluded this kind of focused attention. (There were 58 divisions in 1992 versus 40 in 1980). Thus, many divisions now had to be reviewed in groups. Moreover, when Hewlett and Packard retired, the already swamped CEO could not take time to review each division. The era of Bill and Dave was over.

### The Challenge

Despite HP's financial successes, the following doubts about the company and the HP Way were often heard:

- "Are we getting too big to practice the HP Way?"
- "How can we believe in the HP Way when people are losing their jobs?"
- "Why don't practices apply equally across the company anymore?"
- "Can the HP Way survive in today's intensely competitive environment?"

These issues had been fermenting over a decade. Moreover, the profile of the company had changed from the effects of downsizing and conservative hiring. In 1992, the average age of the HP employee was 40 with an average length of service of about 10 years. This was up from an age of 35 with 6 years of service a decade earlier. As the face of the company changed, so had its behavior and practices.

Lew Platt had to revitalize the HP Way or abandon management commitment to the collection of objectives, values, and practices which comprised it. If he planned to revitalize the HP Way, as he was inclined to do, the challenge was to change the mindset of the organization about the meaning of the many changes that had occurred, or to redefine the HP Way to be consistent with them.

Platt also faced the question of how uniformly the HP Way could or should be applied across businesses and national borders. Could it be applied in developing countries with very different cultures than the U.S.? Should the personal computer and printer business (CPO) be held to the same management practices as the instrument business?

Platt knew that HP had been a special company with an uncommon culture. What worried him most was "that very few companies rise to the top and are able to stay there." Was the loss of the "human touch" reported by the task force a lead indicator of future decline? Would success lead to arrogance and complacency? His tenure as CEO would be judged by his response to these issues.

**Exhibit 1     The HP Corporate Objectives**

(From the company brochure on "The HP Way"):

- **Profit**                      To achieve sufficient profit to finance our company growth and to provide the resources we need to achieve our other corporate objectives.
- **Customers**                To provide products and services of the highest quality and the greatest possible value to our customers, thereby gaining and holding their respect and loyalty.
- **Fields of Interest**      To participate in those fields of interest that build upon our technology and customer base, that offer opportunities for continuing growth, and that enable us to make a needed and profitable contribution.
- **Growth**                    To let our growth be limited only by our profits and our ability to develop and produce innovative products that satisfy real customer needs.
- **Our People**                To help HP people share in the company's success which they make possible; to provide employment security based on performance; to ensure them a safe and pleasant work environment; to recognize their individual achievements; to value their diversity; and to help them gain a sense of satisfaction and accomplishment from their work.
- **Management**            To foster initiative and creativity by allowing the individual great freedom of action in attaining well-defined objectives.
- **Citizenship**              To honor our obligations to society by being an economic, intellectual, and social asset to each nation and each community in which we operate.

**Exhibit 2     The Organizational Values**

(From the company brochure on "The HP Way"):

- **We have trust and respect for individuals**

We approach each situation with the belief that people want to do a good job and will do so, given the proper tools and support. We attract highly capable, diverse, innovative people and recognize their efforts and contributions to the company. HP people contribute enthusiastically and share in the success that they make possible.

- **We focus on a high level of achievement and contribution**

Our customers expect HP products and services to be of the highest quality and to provide lasting value. To achieve this, all HP people -- but especially managers -- must be leaders who generate enthusiasm and respond with extra effort to meet customer needs. Techniques and management practices which are effective today may be outdated in the future. For us to remain at the forefront in all our activities, people should always be looking to new and better ways to do their work.

- **We conduct our business with uncompromising integrity**

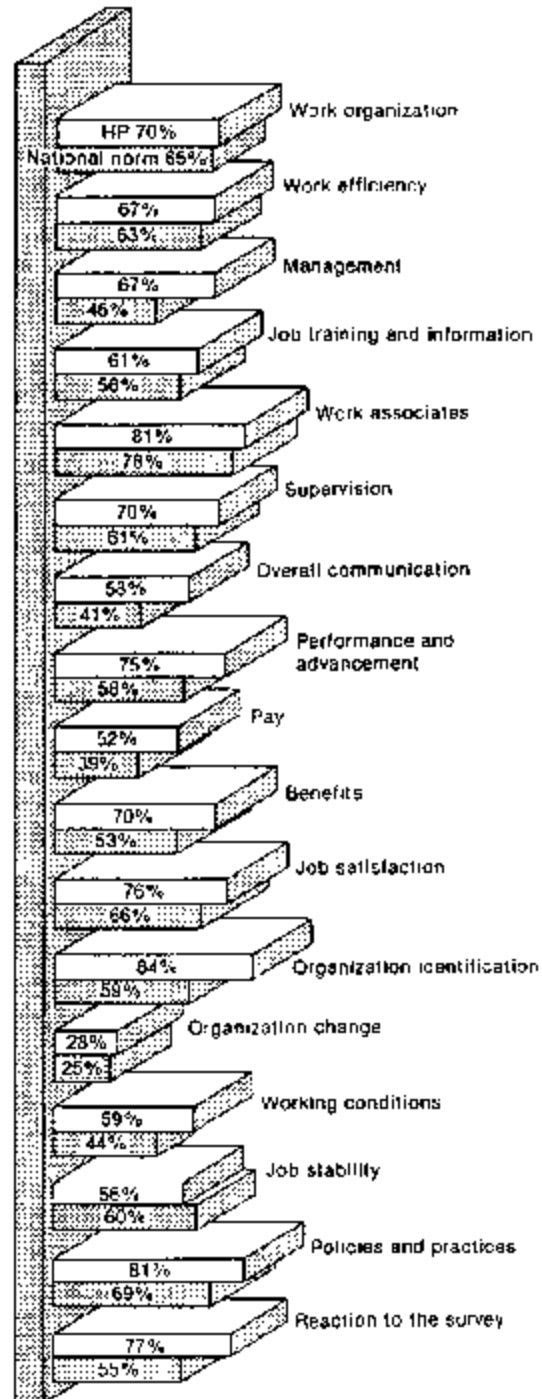
We expect HP people to be open and honest in their dealings to earn the trust and loyalty of others. People at every level are expected to adhere to the highest standards of business ethics and must understand that anything less is totally unacceptable. As a practical matter, ethical conduct cannot be assured by written HP policies and codes; it must be an integral part of the organization, a deeply ingrained tradition that is passed from one generation of employees to another.

- **We achieve our common objectives through teamwork**

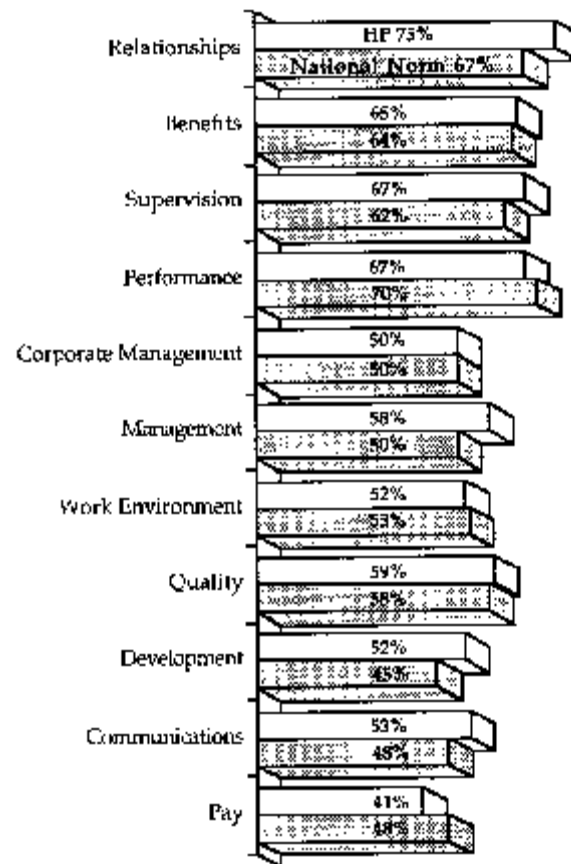
We recognize that it is only through effective cooperation within and among the organizations that we can achieve our goals. Our commitment is to work as a worldwide team to fulfill the expectations of our customers, shareholders, and others who depend on us. The benefits and obligations of doing business are shared among all HP people.

- **We encourage flexibility and innovation**

We create an inclusive work environment which supports the diversity of our people and stimulates innovation. We strive for overall objectives which are clearly stated and agreed upon, and allow people flexibility in working toward goals in ways that they help determine are best for the organization. HP people should personally accept responsibility and be encouraged to upgrade their skills and capabilities through ongoing training and development. This is especially important in a technical business where the rate of progress is rapid and where people are expected to adapt to change.

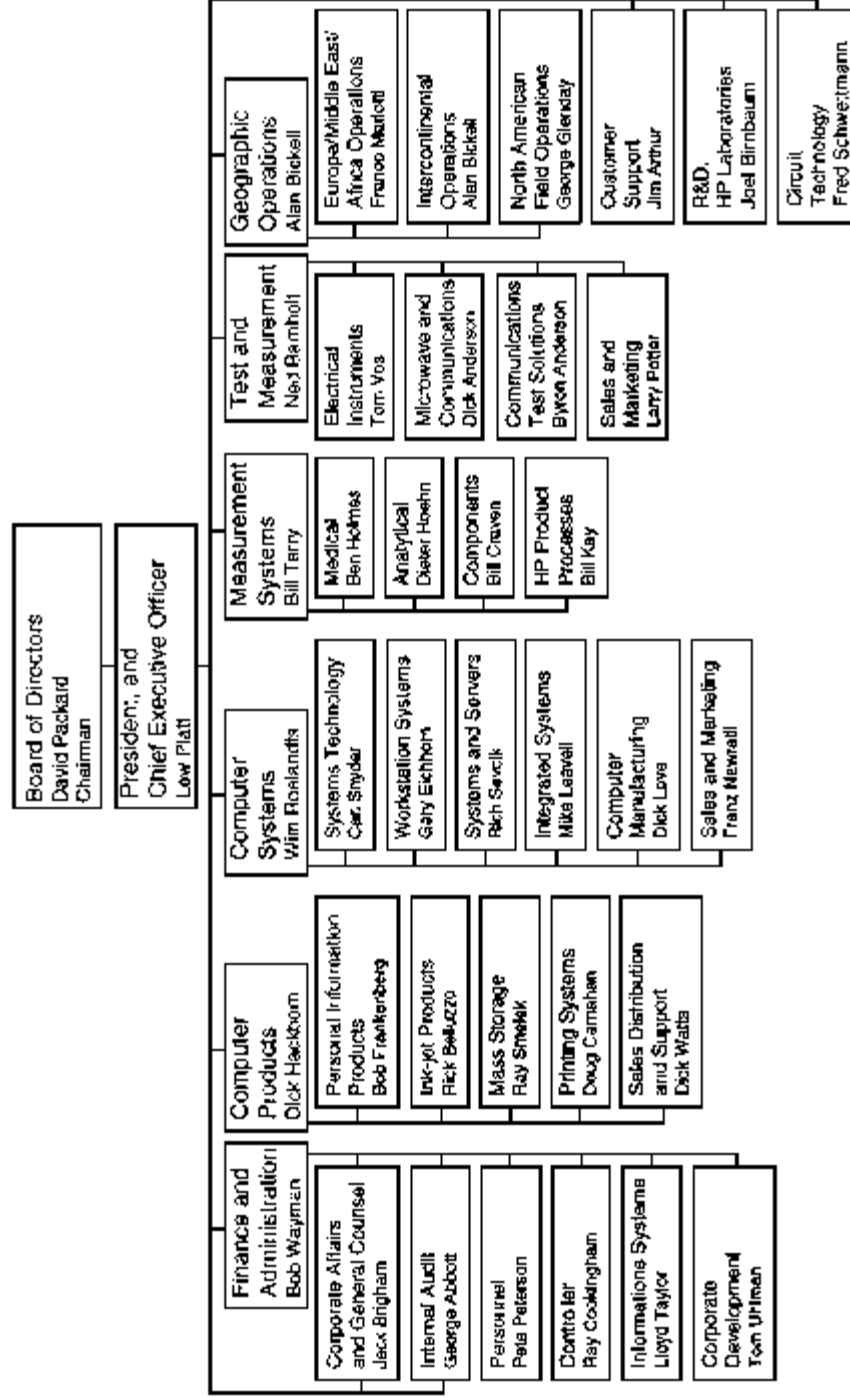
**Exhibit 3** 1979 Employee Satisfaction Survey Results

Note: Percentage of favorable responses by HP employees to a national sample of employees in 200 top U.S. companies, by category.

**Exhibit 4** 1992 Employee Satisfaction Survey Results

Note: Percentage of favorable responses.  
Survey of U.S. employees only.

**Exhibit 5**  
 Organization Chart  
 (November, 1992)



**Exhibit 6      HP's Business Organizations (as of 1990)**

- **Test & Measurement Organization**

With a history that dates to the founding of the company in 1939, the HP Test & Measurement Organization was the world's leading supplier of test and measurement solutions, including test systems, equipment, instruments, accessories, components, and services. T&M's mission was to apply its capabilities in design, test, and measurement to help its customers improve their business results.

- **Computer Systems Organization**

CSO's mission was to be the leading supplier of innovative information technology solutions to the top 1,000 global companies and channel partners. (Channel partners include software vendors, value-added resellers, distributors, systems integrators, etc.) CSO's major product areas included multiuser computer systems and servers, workstations, multimedia, and RISC technology. CSO's products were sold through a direct sales force.

- **Computer Products Organization**

Started in 1984 in Boise, Idaho, the Computer Products Organization began HP's venture into the printer business. Since then HP created the market for desktop laser printers and was the worldwide leader in the commercialization of inkjet technology. CPO was also in charge of the company's PC products. Its mission was to design and manufacture easy-to-use information devices that enabled people to extend their desktop computing capabilities to access information anywhere, anytime. CPO's products were sold through dealerships.

- **Measurement Systems Organization**

This organization included four separate businesses in itself: Medical Products Group, Analytical Products Group, Components Group, and the Information Storage Group. The Medical Products Group marketed more than 900 medical products and supplies, from ultrasound imaging and patient monitoring systems to workstation-based clinical information systems. The Analytical Products Group created analytical instruments, systems, solutions, and services that accelerated the advance of measurement in chemistry. HP's Components Group was the largest independent supplier of communication components in the world. The Mass Storage Group was one of the industry's major suppliers of storage products for the computer / information marketplace.



**Exhibit 5**

Ten Year Consolidated Summary, Years Ended October 31  
(\$ millions except for employee and per share amounts)

	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983
U.S. Orders	\$7,569	\$6,484	\$6,143	\$5,677	\$4,780	\$4,262	\$3,826	\$3,662	\$3,629	\$2,901
International Orders	9192	8,192	7,342	6,483	5,290	4,117	3,395	2,733	2,721	2,021
<b>Total Orders</b>	<b>\$16,761</b>	<b>\$14,676</b>	<b>\$13,485</b>	<b>\$12,160</b>	<b>\$10,070</b>	<b>\$8,379</b>	<b>\$7,201</b>	<b>\$6,395</b>	<b>\$6,350</b>	<b>\$4,922</b>
<b>Net Revenue</b>	<b>\$16,410</b>	<b>\$14,494</b>	<b>\$13,233</b>	<b>\$11,899</b>	<b>\$9,831</b>	<b>\$8,090</b>	<b>\$7,102</b>	<b>\$6,505</b>	<b>\$6,044</b>	<b>\$4,710</b>
<b>Costs and Expenses:</b>										
Cost of goods sold	9,158	7,858	6,993	6,091	4,832	3,867	3,422	3,245	2,957	2,195
Research and development	1,620	1,463	1,367	1,269	1,056	930	848	714	624	493
Administrative and general	4,228	3,963	3,711	3,327	2,859	2,388	2,080	1,796	1,649	1,294
	15,006	13,284	12,071	10,687	8,747	7,185	6,350	5,755	5,230	3,982
<b>Earnings before taxes and effect of 1992 acctg. change</b>	<b>1,325</b>	<b>1,127</b>	<b>1,056</b>	<b>1,151</b>	<b>1,142</b>	<b>962</b>	<b>763</b>	<b>758</b>	<b>800</b>	<b>728</b>
Provision for taxes	444	372	317	322	326	318	264	269	313	269
Reversal of DISC taxes	-	-	-	-	-	-	-	-	-	-
<b>Earnings before effect of 1992 acctg. change</b>	<b>881</b>	<b>755</b>	<b>739</b>	<b>829</b>	<b>816</b>	<b>644</b>	<b>516</b>	<b>489</b>	<b>665</b>	<b>432</b>
<b>Transition effect of 1992 acctg. change, net of taxes</b>	<b>\$332</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Net earnings</b>	<b>\$549</b>	<b>\$755</b>	<b>\$739</b>	<b>\$829</b>	<b>\$816</b>	<b>\$644</b>	<b>\$516</b>	<b>\$489</b>	<b>\$665</b>	<b>\$432</b>
<b>Earnings per share before effect of 1992 acctg. change</b>	<b>\$3.49</b>	<b>\$3.02</b>	<b>\$3.06</b>	<b>\$3.52</b>	<b>\$3.36</b>	<b>\$2.50</b>	<b>\$2.02</b>	<b>\$1.91</b>	<b>\$2.59</b>	<b>\$1.69</b>
<b>Transition effect per share of 1992 acctg. change, net of taxes</b>	<b>\$1.31</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Net earnings per share</b>	<b>\$2.18</b>	<b>\$3.02</b>	<b>\$3.06</b>	<b>\$3.52</b>	<b>\$3.36</b>	<b>\$2.50</b>	<b>\$2.02</b>	<b>\$1.91</b>	<b>\$2.59</b>	<b>\$1.69</b>
<b>Weighted average shares outstanding</b>	<b>253</b>	<b>250</b>	<b>242</b>	<b>235</b>	<b>243</b>	<b>257</b>	<b>256</b>	<b>257</b>	<b>256</b>	<b>254</b>
<b>Number of employees (unaudited)</b>	<b>92,600</b>	<b>89,000</b>	<b>92,200</b>	<b>94,900</b>	<b>86,600</b>	<b>87,300</b>	<b>82,300</b>	<b>84,000</b>	<b>82,000</b>	<b>72,000</b>

**Exhibit 8 Consolidated Balance Sheet, 1991, 1992**

October 31 In millions except par value and number of shares	1992	1991
<b>Assets</b>		
Current assets:		
Cash and cash equivalents	\$ 641	\$ 625
Short-term investments	394	495
Accounts and notes receivable	3,497	2,876
Inventories:		
Finished goods	1,271	1,100
Purchased parts and fabricated assemblies	1,334	1,173
Other current assets	542	347
Total current assets	<u>7,679</u>	<u>6,716</u>
Property, plant and equipment:		
Land	402	390
Buildings and leasehold improvements	2,994	2,779
Machinery and equipment	2,196	2,702
	<u>6,592</u>	<u>5,961</u>
Accumulated depreciation	<u>(2,943)</u>	<u>(2,616)</u>
	3,649	3,345
Long-term receivables and other assets	<u>2,372</u>	<u>1,912</u>
	<u>\$13,700</u>	<u>\$11,973</u>
<b>Liabilities and shareholders' equity</b>		
Current liabilities:		
Notes payable and short-term borrowings	\$ 1,384	\$ 1,201
Accounts payable	925	686
Employee compensation and benefits	913	837
Taxes on earnings	490	381
Deferred revenues	449	375
Other accrued liabilities	933	583
Total current liabilities	<u>5,094</u>	<u>4,063</u>
Long-term debt	425	188
Other liabilities	633	210
Deferred taxes on earnings	49	243
Shareholders' equity:		
Preferred stock, \$1 par value (authorized: 300,000,000 shares; issued: none)	—	—
Common stock and capital in excess of \$1 par value (authorized: 600,000,000 shares; issued and outstanding: 250,824,000 in 1992 and 251,547,000 in 1991)	874	1,010
Retained earnings	6,525	6,259
Total shareholders' equity	<u>7,499</u>	<u>7,269</u>
	<u>\$13,700</u>	<u>\$11,973</u>

**Exhibit 9**      **Orders and Net Revenue by Groupings of Similar Products and Services**  
(1990-1992, unaudited)

For the years ended October 31 In millions	1992	1991	1990
<b>Orders</b>			
Computer products, service and support	\$12,293	\$10,463	\$ 9,390
Electronic test and measurement instrumentation, systems and service	2,257	2,301	2,321
Medical electronic equipment and service	1,004	906	855
Analytical instrumentation and service	678	672	602
Electronic components	529	334	317
	<b>\$16,761</b>	<b>\$14,676</b>	<b>\$13,485</b>
<b>Net revenue</b>			
Computer products, service and support	\$12,028	\$10,217	\$ 9,033
Electronic test and measurement instrumentation, systems and service	2,207	2,377	2,425
Medical electronic equipment and service	1,010	924	892
Analytical instrumentation and service	693	637	581
Electronic components	472	309	302
	<b>\$10,410</b>	<b>\$14,494</b>	<b>\$13,233</b>

The table above provides supplemental information showing orders and net revenue by groupings of similar products and services. The groupings are as follows:

**Computer products, service and support**

Computer equipment and systems (hardware and software), networking products, printers, plotters, scanners, disk and tape drives, terminals and handheld calculators; support and maintenance services, parts and supplies. Products are used for business, scientific and industrial applications.

**Electronic test and measurement instrumentation, systems and service**

Instruments and measurement systems used for design, production and maintenance of electronic equipment; support and maintenance services.

**Medical electronic equipment and service**

Products that perform patient monitoring, diagnostic, therapeutic and data-management functions; application software; support and maintenance services; hospital supplies.

**Analytical instrumentation and service**

Gas and liquid chromatographs, mass spectrometers and spectrophotometers used to analyze chemical compounds; support and maintenance services.

**Electronic components**

Microwave semiconductor and optoelectronic devices that are sold primarily to manufacturers for incorporation into electronic products.