

HARNESSING BRAINPOWER

CREATING A CORPORATION THAT IS CAPABLE OF PRODUCING REVOLUTIONARY PRODUCTS TAKES MORE THAN MONEY: IT TAKES A CULTURE.

W

hen the economy gets tough, the tough look for ways to innovate, says **Hewlett-Packard Co. (HPQ)**. “Customers shouldn’t have to choose between innovation and price or between functionality and simplicity,” says Chairman and CEO Carly Fiorina. “We’re accelerating the rate of our innovation in key areas where we

believe we can deliver high-tech, low-cost solutions and lead the market.”

Fiorina insists that “HP Invent is not just an advertising logo.” This past May, when HP gathered 400 of its top scientists and engineers for an off-site brainstorming retreat in Keystone, Colo., her keynote address called the slogan “a fundamental representation of our past, present and future.”

To make good on its promise to provide cutting-edge technology for business and life, HP reported spending \$3.9 billion, or 6% of 2002’s \$57 billion revenues on research and development and employing 26,000 people in innovation efforts. In addition to research within each of its product groups, HP Labs also operates six research facilities around the globe—Palo Alto, Calif.; Bristol, England; Bangalore, India; Cambridge, Mass.; Haifa, Israel; and Tokyo.

To date, the hardware, software and services company says it has about 19,000 patents worldwide. HP’s inventions range from its first product in 1939—the audio oscillator that it says was essential to the production of **The Walt Disney Co. (DIS)** film *Fantasia*—to the world’s first molecular logic gate, which the company’s Website describes as “a fundamental step in the creation of chemically assembled electronic nanocomputers.”

The aim of HP, and others profiled in the “Thinking Outside the Box” section that follows, is to make products that will revolutionize industries and create new ways of doing business meant to change markets and lives, their leaders say. But can a company systematically create a climate conducive to innovation?

Anthony Warren, director of the Farrell Center for Corporate Innovation and Entrepreneurship at Pennsylvania State University, says companies intent on creating a culture of innovation can. He refers to the fruits of their efforts as a form of return on investment: return on innovation activities, or ROIA.

Based on studies of innovators he considers successful, such as **W.W. Grainger Inc. (GWW)**, **Nokia Corp. (NOK)** and **PepsiCo Inc. (PEP)**, Warren cites factors essential to creating a culture of innovation. Leaders at such companies pour capital into R&D, he says. They encourage innovation through top-down leadership and persuade employees to look outside for new ideas, with the customer often being the best source for new product ideas, he explains. And, according to Warren, innovative companies form collaborations from within and external partnerships with other companies.

BEGIN WITH FINANCIAL COMMITMENT

United Technologies Corp. (UTX) reported allotting well over \$1 billion a year of its own money to R&D in addition to the more than \$1 billion it spent under government contracts in 2002. “R&D is what propels the human condition forward,” says George David, chairman and CEO. Whether it’s the company’s Carrier division creating environmentally friendly air conditioners, or its Otis Elevator Co. division designing safety mechanisms, says David, innovation is key. “That investment has resulted in some of the most exotic inventions on the face of this earth,” he insists, “from stealth helicopters to the engines powering our nation’s next generation of frontline fighters, the F-22 and the Joint Strike Fighter.”

In addition to R&D efforts within its divisions, United Technologies supports a separate 470-employee research center, which brings technical and business expertise together and thus makes innovation a sustainable part of its culture, according to the company. The East Hartford, Conn., center focuses on building its innovation efforts on a solid business model, says David, aiming to maximize the impact of innovation on the company’s financial performance. The center is divided into program offices, each of which partners with a United Technologies company, such as Pratt & Whitney or Otis.

Like United Technologies and HP, **Bayer (BAY)** has global technical and creative centers meant “to promote innovative processes, products and technologies,” says Attila Molnar, president and CEO of Bayer Corp., the German corporation’s U.S. holding company. The centers focus on technical research and testing, for example, as the Pittsburgh-based Americas Technical Center has labs concentrating on plastics, polyurethane and coating materials. “The [centers] let us transfer innovative ideas from wherever they originate to customers in Europe, the Far East or the Americas,” says Molnar.

BY JOHN R. QUAIN | PHOTOGRAPH BY GEOFF SPEAR

ESTABLISH INNOVATION CHAMPIONS

But Warren says that successful innovators do a lot more than spend money and set up separate think tanks. “Most important, the top leadership must demonstrate unequivocally that innovation is encouraged,” he insists.

“I meet with groups of new employees during their first year to explain and emphasize our mission,” says Art Collins, chairman and CEO of **Medtronic Inc. (MDT)**. In 2002, *Fortune* magazine cited Medtronic’s encouragement of innovation when it named it one of America’s Most Admired Companies. Recently, the U.S. Food and Drug Administration identified four new Medtronic “breakthrough” therapies as worthy of expedited review: Activa® (a tremor-control therapy for Parkinson’s patients), InSync® and InSync® ICD (for heart failure) and InFUSE™ Bone Graft (for spinal fusions).

Medtronic, which traces its innovative history to its 1957 development of the first implantable battery-powered pacemaker, encourages its scientists to submit ideas for projects outside their job assignments through its Quest Program, says Collins. “Development of winning ideas is supported with funds and research time,” he says, noting that for the recently completed fiscal year Medtronic invested approximately \$750 million, or 10% of reported revenues, into R&D. The Medtronic Reveal®, an implantable device used to diagnose unexplained fainting, resulted from this program, he points out. In addition, the company’s Corporate Office of Medicine and Technology reviews research strategies, evaluates medical trends and fosters academic relationships and intercompany alliances, says Collins. About two-thirds of current revenues flow from products introduced within the past two years, he adds.

Nike Inc. (NKE) fosters “a consistent and high level of attention, encouragement and support for innovation from top management,” says Mark Parker, president. He points to “highly coveted internal awards to reward those who take risks,” noting, “creative individuals have advanced to very senior levels at Nike, in terms of position and compensation, without necessarily taking on added management burdens.”

ENCOURAGE EXTERNAL COLLABORATION

Innovative leaders also understand that the next big thing could be spawned by a customer’s suggestion or business partner’s request, says Collins. “Medtronic works hard to discourage the not-invented-here syndrome,” he emphasizes. “We encourage collaborations with innovative physicians and ask employees to review external ideas, consider licensing agreements and propose strategic acquisitions as a possible complement to internal activities.” To underscore its efforts, Medtronic holds an annual forum to which it invites its scientists and engineers from around the world. This annual forum, which includes presentations and exhibits, plus informal meetings and gatherings during the year, are two examples of how Medtronic works to cross-fertilize scientific endeavors throughout the company and its businesses.

Although in a different field than the science-based Medtronic, Nike says its approach is similar. “Our personnel are constantly gathering insights from athletes, popular culture, technology and other sources,” says Parker. For example, after polling in-store contacts and working with professional and amateur athletes, an informal group developed a Web-based customization and personalization product service called nikeID.com that lets shoppers order personalized shoes online, points



ART COLLINS, CHAIRMAN AND CEO OF MEDTRONIC, SAYS ABOUT TWO-THIRDS OF THE COMPANY’S REVENUES FLOW FROM PRODUCTS INTRODUCED WITHIN THE PAST TWO YEARS.

“MEDTRONIC WORKS HARD TO DISCOURAGE THE NOT-INVENTED-HERE SYNDROME.”



HEWLETT-PACKARD CHAIRMAN AND CEO CARLY FIORINA SAYS THAT FOCUSED INNOVATION IS NEEDED IN CHALLENGING ECONOMIC TIMES.

“HP IS ACCELERATING THE RATE OF OUR INNOVATION IN AREAS WHERE WE BELIEVE WE CAN LEAD THE MARKET.”

out Parker. “It is a great example of a small group coming together from different parts of the company to develop a new model for creating, selling and delivering customized products via the Internet,” he says.

Going outside also may also help determine whether your company’s innovation will succeed. “We take an idea and we build a prototype,” explains Glover Ferguson, chief scientist at management and technology consulting firm **Accenture Ltd. (ACN)**. “Then we expose the prototype to practitioners and clients, and we shut up and listen. They often come back with a different idea about what we should do.”

Ferguson points out that Accenture is largely involved in a fight for “mind share,” and must find innovative approaches to knotty problems that competitors might also attack. For example, in 1997 the consultancy was contemplating radio frequency identification (RFID) tags that are embedded in products to automatically and wirelessly transmit data about inventory status, he says. To convey the power of the idea, Accenture built a medicine cabinet of the future that could tell its owner what prescriptions to take and when refills were needed, according to Ferguson. He adds that several nationwide retailers, including **Wal-Mart Stores Inc. (WMT)**, plan to incorporate RFID tags in their supply and inventory operations within two years.

Consumers are often catalysts of innovation, says Al Bru, president and CEO of PepsiCo’s Frito-Lay division. He says Frito-Lay this year became the first snack food maker to eliminate trans-fatty acids from such brands as Tostitos, Doritos and Cheetos, because it recognized that consumers wanted healthier snacks. “Changing the cooking oils we have been using for years posed a big operating challenge,” says Bru, “but our purchasing and manufacturing teams made it happen.” He adds that Frito-Lay “continues to add to our line of low- and no-fat snacks with new products like a baked version of our \$1 billion Doritos brand. Not surprisingly, Frito-Lay’s Better-For-You products are now the fastest-growing items in our portfolio.”

Innovative companies must also be continually open to partnerships with others who have complementary core competencies, says Warren. Collaboration among Nokia employees and international research forums and universities meant that Nokia aided in developing the digital GSM (Global System for Mobile communication) mobile phone standard, helping Nokia become a telecommunications pioneer, explains President Pekka Ala-Pietilä. “Throughout its history, Nokia has renewed its core businesses and created innovative approaches in entirely new areas,” he says, noting that the company was founded in 1865 to produce

MEASURE YOUR R&D ROIA

In an attempt “to quantify the benefits of innovating,” Anthony Warren, a professor at Pennsylvania State University, breaks down the effects into four areas: how market share is maintained, how products are improved, how companies can enter new markets with creative products and how businesses change when radical innovations are introduced from within.

Warren points to work that Penn State’s Farrell Center for Corporate Innovation has done, in conjunction with privately held **Imaginatik**, to quantify “return on innovation activities” (ROIA). Mark Turrell, CEO of **Imaginatik**, which specializes in enterprise “idea management,” says he has identified measures that reveal if a company is building a culture conducive to innovation. “To calculate return on innovation, you work out the additional cost of new innovation activities, e.g., new hires, processes, software, reward programs,” Turrell explains.

Once the total cost has been determined, method replacement is the easiest way to determine ROIA, says Turrell, because companies can directly compare the cost of an established process with the new method.

Calculating returns from ideas can focus on revenue generation or cost reduction, explains Turrell. Most companies using this method today, such as Nike and Brady, look at top-line growth as well as controlling the bottom line, he says. David Hawke, executive vice president at Brady, says his company looks at the product development pipeline, then new product sales to judge if its innovations are successful.

Fulfillment of strategic objectives is another measure that justifies the return, says Turrell, by showing that innovations will further corporate strategy. “Innovation needs to be aligned with our central strategy: reducing process costs for our customers,” says Bonnie McIntyre, Grainger’s vice president of special product services.

Of course, not every company that develops a culture of innovation can break down what it does neatly into products and returns. Nike President Mark Parker warns of the need for careful management. “The freedom to explore, balanced by a heavy dose of discipline, is essential,” he cautions.

“In services,” says Accenture’s chief scientist Glover Ferguson, “by the time an innovation is implemented, it’s not your idea anymore. That can be hard, but you’ve got to keep the faith.”

forestry products and gradually expanded into businesses ranging from the manufacture of rubber boots to cable for electric utilities and consumer electronics. To enforce such renewal, he says Nokia has created a “collaborative network that brings together entrepreneurs from across the company and outside our organization for the purposes of acquiring new business ideas.”

In 1998 the company formed the Nokia Ventures Organization (NVO), which established a single group, in Ala-Pietilä’s words, “to identify and develop innovative new business ideas that fall outside the current focus of Nokia business units.” Nokia, where one-third of all employees work in R&D, says Ala-Pietilä, also established the Nokia Venture Fund to support external development projects. NVO’s work has produced new Internet products for mobile devices, Ala-Pietilä indicates.

Nokia’s innovations have led to benefits for society as well as the telecommunications company, says Jorma Ollila, chairman and CEO. “Mobile communications in general offers the chance to decrease our use of raw materials and energy,” he states. “For instance, electronic transaction and storage mean less transportation; easier contact can reduce the need for

travel; smaller products mean fewer raw materials, and some new services do away with physical products altogether.”

As indicated by Nokia’s outreach, innovation in some cases also requires teamwork beyond the corporate walls. Take the partnership between **Brady Corp.** (BRC), a maker and supplier of custom signs, and its longtime distributor, W.W.

Grainger, a provider of industrial supplies, parts and equipment. Seven years ago, Grainger launched its first customer Website, says Richard L. Keyser, Grainger chairman and CEO. “Searching and ordering from our offering of 500,000 industrial supplies online has been very convenient for our customers. In the end, the true measure of a successful innovation is how strongly it helps you drive your company’s business strategy and sales,” he adds.

Meanwhile, Brady was considering how it might increase sales to Grainger customers, says David Hawke, Brady executive vice president. The companies say that together they assigned representatives to develop a Custom Product Center on grainger.com and conduct joint tests. The new application, explains Hawke, lets customers order custom signs on the Grainger Website, then feeds the order directly to Brady for fulfillment.

“We took a highly manual process and made it very efficient for our customers, reducing fulfillment time from two weeks to two days,” explains Bonnie McIntyre, Grainger’s vice president of special product services. Not so coincidentally, she adds, it also accounted for a more than 200% increase in sign sales for Grainger. “Bringing innovation quickly to market requires strong collaborative skills,” insists McIntyre. “The idea of an innovator being a lonely experimenter is obsolete. You need to partner inter- and intra-enterprise for sustainable innovation to thrive.” □



BEYOND ITS USUAL R&D EFFORTS, UNITED TECHNOLOGIES SUPPORTS A 470-EMPLOYEE RESEARCH CENTER, SAYS GEORGE DAVID, CHAIRMAN AND CEO.

“UNITED TECHNOLOGIES’ R&D HAS RESULTED IN SOME OF THE MOST EXOTIC INVENTIONS ON THE FACE OF THIS EARTH.”

SEVEN STEPS TO BUILDING INNOVATIVE CULTURES

According to Anthony Warren, director of the Farrell Center for Corporate Innovation and Entrepreneurship at the Smeal College of Business Administration at Pennsylvania State University, truly innovative companies share several habits. They:

- 1. COMMUNICATE**
 - Encourage planned and random interactions between all functions and divisions, clearly explaining objectives to ensure the constant transfer of knowledge between departments.
- 2. LAY GROUNDWORK FOR TEAMWORK**
 - Emphasize team performance (vs. individual performance) and include members from different departments.
- 3. EMPOWER THE TROOPS**
 - Cede responsibility to staff members; managers should let creative individuals make decisions.
- 4. EMBRACE RISK**
 - Encourage experimentation to generate new concepts.
- 5. PROVIDE SUPPORT**
 - Reward new ideas with individual recognition and corporate resources.
- 6. STRETCH HORIZONS**
 - Go outside the company—to partners and customers—for new ideas.
- 7. FOSTER FREEDOM**
 - Allow for initiative and give employees the ability to follow “unofficial” activities.