

Hewlett Packard

Stage II. Development

Introduction

The **development** of Hewlett Packard was predominantly oriented to new and innovative technology products. The founders relied heavily on their ability to do technological research and development that would result in saleable products. *** Note: new products and markets are identified in red because they are significant developments of Hewlett Packard.** Initially, the products were mainly measurement machines, devices and instruments. With their growing success, HP broadened its scope of R&D, production and sales of technology-based products. As the following information reveals, the company developed an enviable record of breakthrough and innovative products that resulted in outstanding growth, profits/earnings, market leadership and its other objectives.

Growth

During 1938, the first year of their partnership, Bill Hewlett and Dave Packard **developed** their first product, an **audio oscillator**. It was named the HP Model 200A “because we thought the name would make us look like we’d been around for awhile,” said Dave years later. It was an electronic test instrument used by sound engineers. The product’s distinctive feature was a temperature-stabilized resistor in a critical segment of the circuit. The innovation enabled HP to sell the Model 200A for \$54.40 against competitors which were selling less stable oscillators for more than \$200. One of their first customers was Walt Disney Studios which purchased eight Model 220B oscillators at \$71.70 each, for use in testing the Fantasyland stereophonic sound system for the movie Fantasia.

In 1939, the two men decided to formalize their partnership and founded the Hewlett Packard Company. They chose the company’s name with the toss of a coin. Bill Hewlett won the call. His came first in the company name. That year the company had revenues of \$5,369 and two employees. During 1940, HP moved from the small rented garage to rented buildings in Palo Alto. The start of World War II in Europe resulted in a flood of orders by the United States’ government for electronic instruments.

1940s – Becoming established

During the “war years” HP grew dramatically with sales soaring from less than \$35,000 in 1940 to \$106,459 (1941), \$522,803 (1942) and nearly \$1 million in 1943, the year the United States entered the war militarily. During that three year period, sales increased by more than \$918,000 (2,600+ percent). Following WWII, sales slumped.

In 1943, HP entered the microwave field with **signal generators** developed for the Naval Research Laboratory. At the end of the war, the company decided strategically to continue in the microwave market. Microwave products quickly became an important

and growing share of the company's business. Following the war, HP's catalogue featured 39 products. By 1949, revenues exceed \$2.2 million and the company has 166 employees.

1950s – Learning curve of electronics technology

In 1951, HP invented the high speed **frequency counter** that greatly reduced the time required to measure high frequencies. Radio stations used the counter to set frequencies accurately and in compliance with Federal Communications Commission (FCC) regulations for frequency stability. In 1956, HP produced its first **oscilloscopes**, an instrument to show the variations in a fluctuating electrical quantity and a major part of the company's test and measurement products. That year Hewlett-Packard had 215 employees and revenues of \$20.3 million. HP made its first acquisition in 1958, the F.L. Moseley Company of Pasadena. It produced high quality **graphic recorders** and marked HP's entry into the business of **plotters**, a forerunner of its printer business. The following year, revenues hit \$48 million. That year, HP created an employee stock purchase plan for its 2,378 employees. At the end of the decade, the company established an European marketing organization in Switzerland and a manufacturing plant in West Germany. From those bases, HP further expanded its size and scope of manufacturing and marketing operations in Europe.

To accommodate its growth, HP established a product-based, division structure so its growing size would not result in a loss of "nimbleness", i.e., its creativity and adaptability. Each product group became a self-sustaining organization responsible for developing, manufacturing and marketing its own products. Any division that grew to 1,500 people was divided with the resulting groups having their own profit and loss accountability. The decentralized organization allowed the company to react to changing conditions, move quickly and not be constrained by an overly bureaucratic structure.

1960s – Diversifying into medical devices and analytical instrumentation

During the 1960s, HP continued its growth with new products and diversification. In 1961, Hewlett Packard was listed on the New York Stock Exchange as well as on the Pacific stock exchange. That same year, it acquired the Sanborn Company of Waltham, Massachusetts, makers of **medical electronics**, enabling the company to enter a new market. Two years later, HP entered the Asian market. It formed its first joint venture, Yokogawa Hewlett-Packard (YHP) with Yokogawa Electric Works in Tokyo. By 1963, **overseas sales** accounted for 18 percent of HP's business. Its largest foreign markets were Western Europe, Canada and Japan. That same year, HP introduced the **frequency synthesizer**, one of the most complex instruments developed by the company. The synthesizer did the work of an entire battery of instruments and with greater accuracy. It was used for automated testing, advanced communications systems and communications with deep space vehicles. The following year, the company gained international recognition for its cesium-beam **atomic clocks**, designed to maintain accuracy of time for 3,000 years with just one second of error. The cesium beam standard becomes the standard for international time. Atomic clocks became integral components of time-

critical applications such as space shuttle operations, airplane collision avoidance systems and telecommunications. In 1965, the company entered the **analytical instrumentation** field with its acquisition of F&M Scientific Corporation of Avondale, Pennsylvania. The acquisition enables HP to expand further into chemical analysis with its measuring and testing expertise.

Hewlett Packard's expertise in research and development advanced greatly in 1966 with the establishment of the company's central research facility, the beginning of a long history as one of the world's leading **commercial research centers**. At the inception of HP Labs, the primary areas of research included solid state physics, physical electronics, electronics, medical and chemical electronics instruments. That year, HP's first **computer** was introduced. It was developed as a versatile instrument for the company's growing line of programmable test and measurement products. The HP2116A model was the largest single mechanical package that the company had built and marked its first use of **integrated circuits**. Prior to the introduction of the HP2116A, most computers had to be kept in air-conditioned rooms on spring-loaded floors. HP assumed that the 2116A should meet the same environmental standards as the instruments it was used with and be rugged and reliable. Its first sale was to Woods Hole Oceanographic Institute and was used aboard a research vessel in a salt air environment for more than a decade. In 1967, HP diversified into medical equipment with its introduction of a non-invasive fetal **heart monitor** that detected fetal distress during labor. The following year, the company brought out the world's first desktop scientific **calculator**. The high speed, programmable calculator stored programs on magnetic cards and let scientists perform complex calculations without the need to access much larger computers.

1970s – Entering the field of computing products

The decade of the '70s was one of phenomenal growth for Hewlett Packard. During that time, revenues shot up from less than \$350 million to \$2.4 billion (more than 6.85 times). The number of employees escalated from less than 16,000 to just over 52,000 (3.25 times). HP continued its tradition of innovation with the introduction of an array of computing products. To further its growth, the corporation researched, developed and produced new and innovative technological products.

In 1970, HP produced a **laser interferometer** that was capable of measuring to millionths of an inch. It was ideal for machine tool accuracy and enabled the company to become a world leader in that market. Two years later, Hewlett Packard made another advance in personal computing by introducing the world's first **scientific hand-held calculator**. *In 2000, *Forbes ASAP* named HP's calculator as one of 20 "all time products" that changed the world. The same year, the company expanded into business computing with its first **general purpose computer**, the HP 3000. The computer advanced the capacity for distributed data processing and broadened customer uses from high tech engineering and research to daily administrative data processing operations. During the following year, HP introduced the first **electronic calculator** to print Japanese characters. It was marketed in Japan by Yokogawa-Hewlett-Packard. In 1974, the company introduced the first minicomputer to be based on 4K **dynamic random access memory (DRAM) chips** instead of magnetic

cores. That same year, the world's first **programmable pocket calculator** was introduced. The following year, the electronics industry adopted the HP-IB (interface bus) as an international standard, thus allowing one or more instruments to connect readily to a computer.

Through the 1960s and 1970s, the miniaturization trend in electronics increased dramatically. In 1977, Hewlett Packard introduced a combination **wristwatch, calculator and personal calendar**. It was one of the first personal information appliances. The wrist instrument was capable of performing more than 36 functions when manipulating and interrelating time, calendar and numerical data. Both the **miniaturization** of the math functions and the small package engineering were considered to be extraordinary technological feats.

During the 1970s, Hewlett Packard continued to develop new ventures internationally. In 1972, People's Republic of China, under Chairman Mao Tse-tung, invited the company to be the first U.S. firm to discuss trade in electronics. Five years later, following the invitation of the Communist government, Dave Packard made his first visit to China. He made a commitment to helping China's modernization efforts and returned two years later. At that time he toured factories and other scientific facilities. At that time, their hosts expressed interest in a **joint venture** with the corporation. In 1981, HP products were officially available in China through the China Hewlett-Packard Representative Office in Beijing. Four years later, a **joint venture**, China Hewlett-Packard was established.

1980s – Becoming a major player in the computer industry

Through the 1980s, HP's flow of new and innovative products grew greatly. In 1980, it introduced its first **personal computer** and the first **laser printer** that was fast and inexpensive enough for use as an ancillary product. 1982 was a year of **major advances** for the company. In the United Kingdom, HP Limited developed an **electronic mail system**. It was the first major wide-area commercial network based on minicomputers. The same year, HP introduced the first "**desktop mainframe**", using 32-bit "superchip" technology. Its capacity was the same as the room-sized computers of the 1960s. The company's third innovative product brought out that year was its first hand-held computer. With 16K RAM and 48K ROM, it ran BASIC and VisiCalc. Weighing just 26 ounces, it provided 50 functions and was an early tool for mobile computing, connecting with peripherals such as a modem, digital cassette drive and printer/plotter. A **touchscreen personal computer** was introduced by HP in 1983.

In 1984, Hewlett Packard emphasis on technological research, development and commercialization continued. It opened a new research facility HP Labs in Bristol, England which was the largest such operation outside of Palo Alto. The same year, it introduced another breakthrough product, a high quality, low priced **thermal inkjet printer** based on the technology that the company had developed. This printer effectively made dot matrix printers obsolete. The company's inkjet technology R&D was started at the HP Labs in 1978. By miniaturizing the large, industrial inkjet marking devices and

offering it as an ancillary product for personal computers, HP was able to offer better print quality, lower power consumption and low cost printing. Such competitive advantages enabled the company to gain a major share of the printer market. Currently, HP inkjet printers continue to provide technological advances at “ever decreasing prices”. During the same year, the HP **LaserJet printer** was introduced. In subsequent years, it would become the company’s most successful single product and the world’s most popular personal desktop laser printer.

The corporation’s growth was evident by its revenues of \$6 billion in 1984, double what it was four years earlier. Its **productivity advances** were indicated by the company’s 47 percent increase in employees to 84,000 while revenues jumped 100 percent during the period of 1980-84. At the end of the decade, revenues nearly quadrupled to \$11.9 billion and the number of employees rose to 95,000, an increase of about 38,000 jobs or close to 67 percent more than in 1980.

Technological advances continued to impact on Hewlett Packard. In 1986, it was the first major computer company to introduce a commercial application of precision architecture based on **reduced instructions set computing (RISC)**. The use of RISC microprocessors made computers more powerful, faster and less expensive. Developing the RISC technology took HP five years and was its most expensive R&D endeavor to that point.

While technological advances and organizational growth abounded in HP, historical events were being experienced. In 1987, Bill Hewlett retired as Vice Chairman of the Board of Directors and named Director Emeritus. The original garage rented by Dave Packard in 1938 was granted state landmark status by California. In 1989, Hewlett Packard celebrated its 50th anniversary.

1990s – Marrying technologies and the effects of maturation

Miniaturizing its products continued at Hewlett Packard in 1991 as the company introduced the **palmtop personal computer**, weighing only 11 ounces. It was roughly the size of a large pocket calculator and had as much computing power as a desktop personal computer system. Programs in the palmtop included a financial calculator, telephone numbers and addresses, Lotus 1-2-3, a simple text editor and an infrared link for transferring data. The same year HP introduced the **color DeskJet** which created a revolution in color printing. Expensive, specialized machines were replaced by HP’s high quality, relatively inexpensive color printing systems. In 1992, the HP **Corporate Business Systems product line** was introduced. It was comprised of nine HP computing systems with mainframe performance at a price that was as much as 90 percent lower than competing systems.

That year heralded the development of HP’s *Design for Environment* policies that were intended to make products more environmentally compatible. As part of its on-going ecological initiatives, the company introduced its *Energy Star* label for printers. In 1996, HP recycled its 10 millionth LaserJet cartridge. The following year it expanded the

recycling program to include HP inkjet print cartridges. By 1999, the company had tripled its recycling of LaserJet cartridges to 30 million.

In 1993, the company introduced the three pound **OmniBook**, a “superportable” **personal computer** with battery power enough for use during a flight across the United States. That same year, the company shipped its 10 millionth LaserJet printer. The following year was a bonanza with revenues increasing by \$5 billion, reaching \$25 billion, and more than double its level of 1989. 1994 was also a year of major **product** introductions, including the **light-emitting diode (LED)**. LEDs replaced incandescent lights in new applications such as cars, traffic control signals and moving message panels. HP started collaborating with Intel to develop a common 64-bit microprocessor architecture for the computers of the 21st century. Their new technology drew on years of R&D at HP Labs that was intended to replace the PA-RISC processors. That year HP brought out its **OfficeJet personal printer-fax-copier**, a space-saving, cost-effective unit designed specifically for professional home office users. In 1995, the **HP Pavilion PC** was introduced into the home computing market.

Employee commitments

One of the physical developments emanating, in part, from *The HP Way* was the corporate headquarters that were completed in 1960. Located on a 50 acre hilltop site, the new buildings supported Hewlett Packard’s philosophy that people require attractive and pleasant surroundings to attain maximum job satisfaction and performance. The air-conditioned complex made extensive use of glass to provide maximum natural lights and views of San Francisco Bay. The site included a landscaped patio, horseshoe pits, volleyball and badminton courts and a large cafeteria, all for the use of employees. Through the coming decades, the corporation’s progressive management would be manifest in many ways, including its on-going emphasis and investment in research and technology, humanistic human resources management and an electronic hardware recycling program. In the 1990s, HP started a recycling program for its LaserJet printing cartridges. In its first five years of the program, 10 million cartridges are recycled. By the end of the decade, more than 30 million LaserJet cartridges had been recycled. In the early 1990s, the company developed Design for Environment guidelines that were intended to make HP products more environmentally compatible. Its policies on work-life balance, diversity and community involvement contributed to the attraction and retention of quality employees.

Notes

The history of Hewlett Packard epitomizes development. From its first audio oscillator in 1938 through electronics technology, sensors, microwave, laser, printers, miniaturization and other technologies, HP has been a world leader in developing new products and markets. It has been a major source of breakthrough and innovative technology. Technology-based developments were not the company’s only significant achievements. HP developed an enlightened and progressive approaches to its employees. The founders believed that the company’s employees should share directly in

the success of HP. In its second year of business, the company paid its first bonuses to employees as well as its first charitable donations. From then on, HP has had a long list of progressive human resources developments: participatory and informal management, open corporate culture, profit-sharing, pension plan, medical insurance, flextime, social activities, community volunteering from the local to the federal level and numerous other humanistic principles and practices. Such humanism also was evident in the company's attractive, pleasant and open physical facilities.

Much of the progressive development of HP was based on the founders' personal philosophy, especially the values of caring and sharing. Clearly, Bill and David cared about the other members of the company. That is evident from the various ways they shared the company's success. Those values were also evident in *The HP Way*, HP's objectives and the numerous ways they were manifested. The corporate objectives provided seven vital areas of focus: growth, profits, leadership, employees, customers, markets and citizenship. Those aims provided a reasonably well-balanced set of aims that were useful to direct the company on a day-to-day basis as well as in the longer term future.

Critics have questioned the absence of stated objectives and policies toward the company's technology, suppliers, investors and other stakeholders, relations with governments, especially in regard to military contracts and conflict of interest as well as an absence of progressive environmental statements. Despite the absence of objectives and policies related to the environment, the company developed programs of recycling printer cartridges and other ecologically-friendly programs and activities. What started out as tactical evolved into strategic developments.

Similarly, the company developed its military business from short term tactical sales of microwave-based products into a major strategic market. Clearly, much of HP's development emanated from the United States' military, starting with World War II contracts and expanding through the Korean War, the invasion of Viet Nam and the expansion of military programs throughout the world and into space. HP's involvement with the U.S. military created a vital strategic alliance for the company throughout most of its history.