HOW HEWLETT-PACKARD RUNS ITS PRINTER DIVISION

By Lawrence M. Fisher

Against fierce global competitors, from some of the world's best companies, Hewlett-Packard's printer division has managed not only to persist, but to grow. How has the company beaten back the competition? It takes a willingness to change before problems occur.

Most companies consider re-engineering business processes when growth slows or sales decline. But the maintenance of best practices requires a willingness to reevaluate and to make strategic changes proactively, even during the best of times. So it was for the Hewlett-Packard Company when the management of its industry-dominant inkjet printer division determined it was leading the wrong market.

At the time, about two years ago, Hewlett-Packard's inkjet printers had attained a market share in the low 50's, or more than twice that of the company's closest rival, Canon Ltd. of Japan. H.P.'s factories around the globe were all working at capacity, producing 600,000 printers a month plus millions of replacement ink cartridges, and every one of these products was sold as fast as it entered the reseller channel. Every model the company made was in a near-constant state of allocation as demand outstripped supply.

It was amidst this seemingly enviable state of affairs that Antonio Perez, general manager of Hewlett-Packard's Inkjet Products Group, realized that something was fundamentally wrong. He decided that the inkjet printer, which H.P. and its competitors had all largely aimed at the corporate office and small business market as a less expensive alternative to laser printers, was really, by virtue of its capabilities and costs, better positioned as a consumer product.

The decision was as much pragmatic as it was revelatory: lasers were coming down in price, threatening the profitable high end of the inkjet business, while the inkjet, with its ability to do low-cost color printing, was well suited to the suddenly fast-growing home PC market. All the same, it was a decision that drove H.P. to reexamine all of its business processes — research and development, manufacturing, distribution, marketing and sales — and in the end forced major changes in every one.

"Our business model was conceived under the impression that office printing was our destiny, so it was as if we took our sailboat and headed in that direction," Mr. Perez said. "But when some of us realized we were heading for the wrong port, it took a long time to convince all the sailors, because even though the destiny was wrong, we had been doing a great job of sailing, and from the beginning we had a great market share. The biggest issue was not technology, it was culture."

It was a wrenching transition, all the more challenging because it had to be accomplished rapidly to catch the fast-shifting changes in the home market. Relationships were strained within Hewlett-Packard management, as well as with key suppliers and ven-

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dors. But within nine months, H.P. had doubled inkjet printer production, to 1.2 million units a month — now nearing 1.5 million — and had increased its market share to more than 60 percent worldwide. And the transformation remains a work in progress as Hewlett-Packard broadens its inkjet product line to include copiers, fax machines and, soon, digital photography.

Few companies have the technical, financial or cultural resources of a Hewlett-Packard, whose fabled founding in a garage in Palo Alto, Calif., in 1938 gave birth to Silicon Valley. But many have discovered that they must learn how to compete in new markets. And most can learn from the willingness of Hewlett-Packard's senior management to implement tough changes before problems arise.

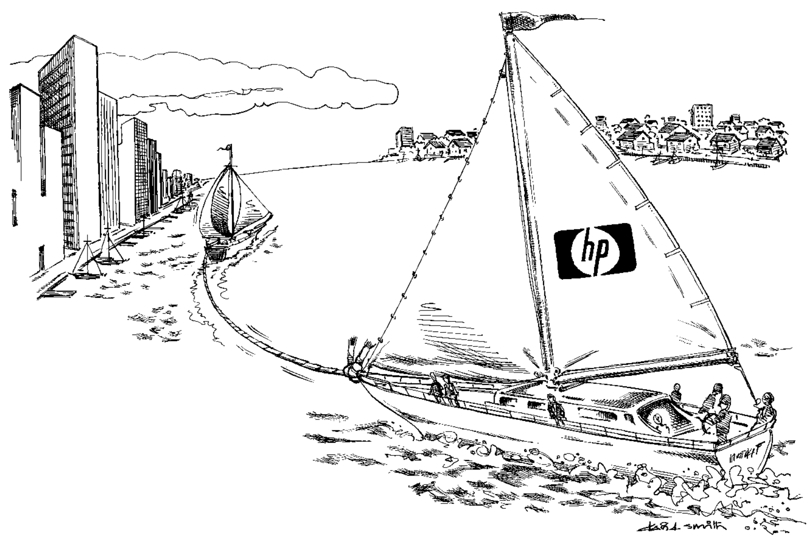
Senior management implements tough changes before problems arise.

In some ways, their task was eased by the fact that the inkjet printer was already perhaps the closest thing in the computer industry to a true consumer device, and something of a prototype for a digital appliance. It concealed a wealth of sophisticated technology in a product of toaster-like simplicity. And it was a classic razor-and-blades business: printers sold at relatively low margins, but each printer owner typically bought three or four ink cartridges every year. And just as with Gillette's Sensor Excel, the high technology, and the high profit margins, were in the consumables.

Hewlett-Packard and Canon invented inkjet technology simultaneously, independent of each other, in 1979, but H.P. moved its discovery out of the lab and onto store shelves more rapidly, introducing the first DeskJet printer in 1984. Inkjets work by heating a special liquid ink and spraying it through hundreds of tiny nozzles in different patterns to form characters or images on a page. The printer head, which is included in the replaceable cartridge, is a silicon chip, and like all such devices benefits from the economies of scale. Making one is expensive, making millions is cheap. Laser printers, first developed by Canon, use an entirely different and inherently more costly technology derived from photocopiers.

But while H.P.'s Inkjet Products Group had the right technology for the consumer market, its culture was all wrong. For 10 years, Hewlett-Packard had designed and built printers the same way it made its name in test and measurement equipment for engineers: manufacture the best possible product, charge what you need to and deliver it when you can. Corporate customers would pay more for the additional features, higher performance and greater reliability H.P. was known for, and they would wait for new products to arrive, so the division's inability to meet demand, or to be on so-called allocation, was not a problem. Buyers looked first at features, second at cost and last at availability.

The consumer market turned those priorities upside down. Availability became priority No. 1, because if an H.P. printer was not on a retailer's shelves, customers would buy Canon or Epson with very little hesitation. Price had to be equal to the competition, and features comparable. No one was going to pay a



Illustrations by David Smith

premium for the H.P. brand name. This set of new priorities presented a challenge to Hewlett-Packard's management and culture.

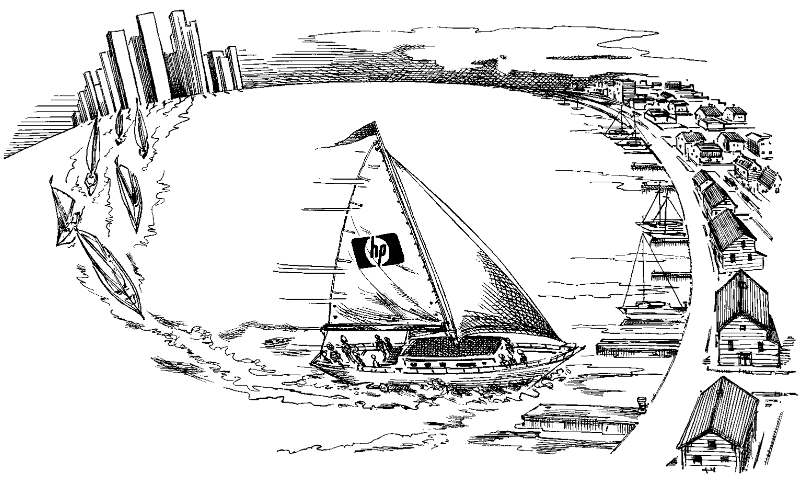
Winning the battle on "features was easy," Mr. Perez said. "We know how to do this; we're an engineering company, we can do anything. What we didn't realize, because we were sailing to the wrong port, was that availability was all. Being on allocation was the worst thing we could have done; it was an invitation to competitors."

Big boats usually change tacks slowly, but H.P. had to come about fast. The market for personal computers in the home was exploding, and nearly every one of those home PC's represented a potential printer sale, sales Hewlett-Packard was in no position to fill. Manufacturing capacity had to be increased as rapidly as possible.

For this task, Hewlett-Packard's deep pockets were essential. Not only could it afford the multibillion-dollar cost of starting new silicon wafer manufacturing sites, and the temporary hit to profit margins incurred in increasing volumes, it could also lean on key suppliers to make similarly heroic efforts. "We said we have to work 48 hours a day, no matter the cost, and we went to our partners and said they had to as well," Mr. Perez recalled. "We had nine months of pain, but the extra volume paid for it."

Of course, the issue was more complex than simply increasing manufacturing output. The home market is more seasonal and volatile than the corporate world, "which suggests that we had to do more regional manufacturing than we used to," to take account of market differences around the globe, said Pradeep Jotwani, H.P.'s general manager, consumer sales and marketing, who is based in Santa Clara, Calif. "So we stepped up our factory in Barcelona and started a new one in Dublin; we stepped up production in Singapore and started a new plant in Shanghai. As well, we added more contract manufacturers for an easier buffer in the peak times."

Production was also increased at Hewlett-Packard's sites in Vancouver, Wash., Corvallis, Ore., and Puerto Rico. The inkjet group's San Diego headquarters, which is both a design center and a production facility, is currently undergoing a major expansion. Mr. Perez works out of a cubicle in a leased building.



The production hike also tested H.P.'s contract manufacturers. The Solectron Corporation of Milpitas, Calif., had long manufactured PC and printer components for Hewlett-Packard in a factory in Panang, Malaysia. That factory had additional capacity, but in order to practice just-in-time inventory management, H.P. needed a source closer to its facility in Singapore. So Solectron was persuaded to build a new factory in Johore, in southern Malaysia, just two hours away, even though this meant accepting lower profit margins.

"In the spirit of partnership and the strategic alliance, we have given a preferential model to Hewlett-Packard," said Joe Tang, Solectron's vice president for Malaysia. "We are patient with the progress. We believe that if we behave accordingly we will be compensated in time."

Doubling production in nine months' time was a Herculean task in itself, but Hewlett-Packard found that the consumer market also drove changes in how it manufactured products, which in turn drove changes in how products were designed. The quality control people had to accommodate issues like airborne lint and broad ranges of humidity that they had never needed to consider in the pristine, air-conditioned world of the corporate office. Engineering devised a new test for home market printers: dropping a weight on the machine equal to a ream of paper falling from a high shelf.

But perhaps the greatest need was for increased flexibility. Hewlett-Packard had satisfied the corporate market with just five DeskJet models, which were differentiated primarily by features and performance. Now it has more than 50 models, or in retail parlance, SKU's, for stock-keeping units. And the DeskJet has been joined by CopyJet, a color copier; OfficeJet, a combination fax, printer, copier; and DesignJet, a large-format, poster-size printer for industrial use.

"We created more SKU's to attract more kinds of people," Mr. Perez said. "As a market leader, the best way to defend your turf is to segment it. Nobody can really make a full frontal attack on our business. Plus, this is the real world; people enjoy having a choice."

Designing 50 different SKU's from scratch would have been prohibitively expensive, so Hewlett-Packard designed a series of common platforms. These are relatively generic machines that can be customized by adding different features; the idea is to share the most expensive technology across the greatest number of SKU's while reserving the greatest flexibility to meet different market segments. Nevertheless, the differences between SKU's must be real, not just cosmetic.

To match different SKU's with target markets, H.P. uses a process it calls the "House of Quality," which is a matrix of features and customer needs. "We describe who the customers are and actually give them a name, a lifestyle, an income level," Mr. Perez said. "We take the five or six most representative customers we're going to try to attract and determine what is important to them, what they want most. You end up with a whole list of 'musts.' "

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To maintain the flexibility of the common platform design for as long as possible, Hewlett-Packard adopted a new manufacturing model based on postponement. Before, its factories shipped finished goods to distribution centers, which in turn supplied dealers. Now, products are shipped in a generic state, with the SKU-determining features added at the distribution depots. Whether a product reaches a dealer's shelf as a copier or a fax machine, for example, is determined as late as possible, allowing greater responsiveness to market demands. Geographic variations in SKU's can also be accommodated by moving unfinished goods from one country to another.

Because time to market is more critical at the consumer end of the business, H.P. needed a way to get production up to top speed more quickly, to "ramp" in industry jargon. While in the past, production usually began at a design center in the United States and then shifted overseas, now the two factories may build production together, a parallel rather than serial process.

"Even before the product goes into production in the United States, our engineering people work very closely with R.&D. and manufacturing to make sure it can ramp very quickly," said Tommy Lau, general manager of H.P.'s Asia/Pacific business unit in Singapore. By ramping Singapore and Vancouver simultaneously, "overnight you basically double the capacity," he said.

But clearly the new practices at the printer division also created greater complexity, which strained the management structure. Historically, the InkJet Products Group had been an umbrella for three independent organizations: Imaging, for large-format printers and scanners; Technology, for printer heads and ink; and Printers, for stand-alone printers. In the new order, this structure was unworkable.

"The fact that there were three was not helpful because they all had different opinions, so we reorganized as just one group," Mr. Perez said. "The new management team said, 'O.K., we're running a different business. If 70 percent of our customers want to buy this way, we need to adapt.' "

At the same time, the printer division fell into step with a company-wide reorganization that shifted the focus of business units from products to markets. In the old model, for instance, the plant in Boise, Idaho, had been responsible for marketing laser printers, while Vancouver managed

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The Next Challenge: Consumer Photography

Spend any time with Antonio Perez, general manager of Hewlett-Packard's Inkjet Products Group, and he will produce four color snapshots, seemingly identical. Which one was made on an inkjet printer, he will ask, and which are the products of traditional photographic processes? Inevitably, people pick the wrong picture, and Mr. Perez smiles.

Next spring, Hewlett-Packard will launch a foray into the $35 billion consumer photography market. The initial offering will be small — a camera, a scanner for old prints and two printers plus the necessary software — but the goal is immense: to replace this last outpost of analog technology with a digital format. "There is no doubt in my mind that the way we do photography is going to change," Mr. Perez said. "The question is only how fast."

Perhaps the most important lesson H.P. learned from moving printers into the consumer market is that having the right product is only a first step. Design, manufacturing, distribution and sales must all fall into sync if that product is to succeed. In looking at the photography market, which sells through entirely different channels than do printers and taps millions of customers who do not own personal computers, Hewlett-Packard realized early on that it would have to partner with strong players.

"To produce a complete home imaging system is not something we could easily do ourselves," said George Lynch, manager of research and development for H.P.'s imaging program, in San Diego. "But next spring we will have one, hardware and software. Bringing together all these technologies is a huge task; on top of that, it has to be very easy to use. We're pushing all the technical and time-to-market vectors at once."

The most important lesson Hewlett-Packard learned is that having the right product is only a first step.

Hewlett-Packard's partners in the new venture are the Microsoft Corporation, for its ability to define and establish de facto software standards, and the Eastman Kodak Company, for its expertise in developing imaging products and its formidable command of the retail channel. H.P.'s new system will be compatible with Kodak's existing Photo CD products and digital cameras. The fourth player is an unknown, Live Picture Inc., a tiny startup company based in Aptos, Calif., that is now run by John Sculley, the former chief executive of Apple Computer Inc. Live Picture was included at the request of Kodak for its breakthrough digital imaging technology. H.P. executives hope these players can make FlashPix, their offering for consumer digital photography, a new standard overnight.

"We can't force anybody to use the standards the huge companies agree to," Mr. Lynch said. "We just have to make them so good and so accessible that people want to use them."

The vision for FlashPix is that consumers would not only be able to take pictures with a digital camera, manipulate them on their PC's for cropping and color balance and then produce them on an inkjet printer. They would also be able to send high-resolution images across the Internet to anyone with a personal computer, or perhaps a digital appliance yet unknown. Grandma could download the birthday pictures in Peoria. Customers could view a digital "proof sheet" on their monitor at home, and instantly send their favorite images to a professional site for photo-quality poster-size prints.

"This would allow service providers to create profitable business models using imaging," Mr. Lynch said. "The key from our perspective is to get people to agree on standards so we don't have the VHS/Betamax contest all over again. This beautiful technology we've designed needs to be invisible to the consumer."

Hewlett-Packard's experience with the OfficeJet — a multifunction product combining a scanner, printer, copier and fax — is that the buyers of new technology tend to be less receptive to advertising than they are to articles in the press and to word of mouth. Accordingly, there have been no ads yet for the photographic products, but instead a targeted public relations effort, which has landed such plums as a full page of coverage in Business Week.

"Our learning so far is to insure that expectations are modest in terms of ramp," said Pradeep Jotwani, H.P.'s general manager, consumer sales and marketing, referring to how long it will take for the new camera products to hit their stride. New kinds of products "always seem to take off more slowly and require more investment than originally planned,'' he said.

But if initial expectations are modest, the long-term goals are ambitious. Although H.P.'s first photography products will require a personal computer, to process and store the images, the second generation will allow the digital camera to send photos directly to the printer, possibly even by a wireless connection. Early cameras and printers will both cost in the $300 to $500 range, but experience and market necessity both dictate that these prices will come down. In the not-too-distant future, H.P. engineers confidently say, the company will deliver the ultimate in low-cost consumer technology: the disposable digital camera.

In the near term, Hewlett-Packard is still figuring out how to make money in this new market.

"Enabling people to create profitable business models will be a fundamental driver," Mr. Lynch said. "If the imaging business can grow tenfold, I'm sure there's another printer sale in there for us. The sooner we can figure out how to make other people make money, the more profitable we will be." SB

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inkjets, with the perhaps predictable result that Boise always lagged in the consumer market and Vancouver, by comparison, underperformed in corporate sales. In the new model, Boise serves the corporate market while Vancouver services the consumer channel, and each has access to both ranges of products as needed.

This change was important because, in addressing the consumer market, Hewlett-Packard had to develop an entirely new sales channel. H.P. had grown its printer business, laser and inkjet alike, in tandem with the so-called Comdex channel, computer resellers who had grown up with the PC. Most of these dealers — companies like MicroAge Inc. of Tempe, Ariz., and Entex Information Systems of New York — have evolved from storefront operations into primarily field-sales organizations, calling on major accounts. They are invisible, or worse yet, intimidating, to consumers.

"Fundamentally, we must be active in the channel where the consumer prefers to buy, and that is not the traditional computer reseller, it's retailers," said Mr. Jotwani, the consumer sales and marketing manager. "Now I must sit down with Wal-Mart and say, five months out, 'Put this SKU in your Thanksgiving flyer and I will drop-ship sufficient quantities for your 2,000 stores,' and make sure by hell and high water that they are there on time. This has required a fundamental restructuring within the company."

Big retailers, like Wal-Mart, Best Buy and Circuit City, operate with a completely different set of rules than computer resellers. Because they are often located close to direct competitors, they demand special SKU's to discourage comparison shopping; because they buy in immense volumes, they get what they demand. Resellers operate on a long sale cycle and typically order only as much as they know they can sell; retailers order more than they need and expect to return the overstock.

In the old order, "we made standard products and we were known in the channel for fairness," Mr. Jotwani said. "We put out a well thought-out program and drove it everywhere. The channel may not have liked it, but they knew nobody else was getting a better deal. This is a different world; we are trying to be fair and equal and different."

Marketing and merchandising have had to react to the new world as well. In the corporate market, knowledgeable resellers have ample time to educate buyers, who in turn may buy hundreds of units at a time. In the retail store, harried clerks rush to close a single sale as rapidly as possible. Hewlett-Packard's research found that the typical customer makes the printer purchase decision last, after the PC, monitor and software; spends just three to five minutes in the printer aisle, and remembers only one piece of information from display materials.

"Recognizing that we're a small slice of their time, our goal is to make sure people are as predetermined to buy H.P. as possible," said Andrew Tallian, H.P.'s North America consumer marketing manager, based in Vancouver. "The consumer mind has a lot more to worry about than a corporate buyer, so we need to get information to them in an efficient way that resonates with them."

To their dismay, Hewlett-Packard's marketing executives found that their venerable brand, which stood for engineering excellence and reliability in corporate buyers' minds, translated as high quality at a high price to consumers. Through co-marketing and bundling deals with market leaders like the Microsoft Corporation and the Walt Disney Company, Hewlett-Packard is seeking to make its brand more synonymous with innovation and value, but executives concede it is a work in progress.

Taking a cue from the longstanding close relationship between the Procter & Gamble Company and Wal-Mart, H.P. is also working more closely with retailers to make sure that its marketing efforts jibe with theirs.

"We have started in the last nine months to work very concertedly with merchandising managers to change their store layouts in some proactive ways," Mr. Tallian said. "We're working with them to see what sort of information should be there for the whole printer category."

These efforts have been a learning process for both H.P. and its retailers, with some inevitable conflicts. While Hewlett-Packard would like to present a consistent message from store to store, retailers crave their own identity. H.P. is seeking a way to, in effect, customize its brand to fit its surroundings.

Steve Embree, vice president for general merchandise at Office Depot, the giant office supply chain that is merging with Staples Inc., said that initially, Hewlett-Packard showered the chain with point-of-sale materials. "In the beginning, it was, 'This is what we're going to do, Office Depot,' and we said, 'Right, but you're not going to do it with us,' " he said. Now, "they're receptive to what we're trying to do in the store."

"It hasn't been the smoothest of rides," Mr. Embree added, "because we have a lot of cultural differences. Retailers like us have to make decisions very quickly, and in the beginning that was something we could not get H.P. to do."

The flip side is that H.P. helped Office Depot, which is based in Delray Beach, Fla., get more efficient and increase inventory turnover. "All retailers want to talk about is profit margin; H.P. is helping us understand the other side of the equation, asset turnover," Mr. Embree said. "H.P. really cares about sell-through."

Indeed, in the new model, Hewlett-Packard's own sales people are no longer compensated based on the number of orders they book, but instead are measured by the amount of product that sells through, from retailers to customers. "The motivation is completely different," in the consumer market, Mr. Perez said. Sales people "should not get paid for orders, because the retailer can return everything."

One reason that the inkjet group could implement such broad changes is the decentralized structure of Hewlett-Packard, which goes back to the set of principles its founders called "the H.P. Way." The guiding management theme for William Hewlett and the late David Packard was that if you hired intelligent people, empowered them to make their own decisions and got out of the way, good things would happen. Following that model, managers of H.P. business units operate as independent entrepreneurs, with full profit-and-loss responsibility and accountability.

But with so much on their plate, those managers can be difficult to reach. In the consumer market, with a need for rapid decisions all over the globe, the inkjet group is now seeking ways to spread decision-making further. "We are creating frameworks of accountability," Mr. Jotwani said. "We are trying to move these frameworks downstream, either on an account-specific or a country-specific basis."

Early results are encouraging. In Spain, where H.P. market share trailed its worldwide level, the local group was allowed to carve out its own marketing strategy. It chose to forgo advertising entirely, and concentrate very heavily on in-store promotions, a van tour and demonstrations. "They signed up a broader channel, and put a great deal of emphasis on merchandising," Mr. Jotwani said. The result was a jump in market share, to 63 percent, from 48 percent, in one year.

That was a substantial gain, in a market that was also growing at the time. But Mr. Jotwani sounds a cautionary note as well. "The danger with this kind of empowerment is that you wind up with short-term gains rather than brand building," he said. "So we are measuring brand as well."

Hewlett-Packard has already extended inkjet technology beyond printers to such related devices as copiers and fax machines. But the most ambitious move will come next spring when it enters the $35 billion photography market with an inexpensive digital camera and a new line of printers that can produce photo-quality color prints. (See accompanying article.)

Again, Mr. Perez said he believes the challenge is not to the technology — inkjets have been able to produce photo quality for the past five years — but to the culture.

If Hewlett-Packard succeeds in the photography market, it will have to increase volumes far beyond the levels needed to saturate the PC printer business, and it will again need to learn the ways of new channels. But with the foresight gained from its foray into the consumer market, the inkjet group's management is already reexamining its business practices, identifying those that work now but may not work in the future.

"Two years ago, we implemented these changes; we're not perfect, but we're 300,000 times better than we were," Mr. Perez said.

But in the best spirit of best practices, the company is not ruling out the need to make more mid-course corrections and head for still another port.

"This technology is still young — we will see all kinds of applications we haven't dreamed of yet," Mr. Perez said, quickly adding, "At the same time, we are continually searching for a new technology that will be a threat to us." SB

Reprint No. 96408

"If this plant is automated why can't it push its own buttons?"

Cartoon by Charles Barsotti