Outsourcing Innovation

First came manufacturing. Now companies are farming out R&D to cut costs and get new products to market faster. Are they going too far?

As the Mediterranean sun bathed the festive cafés and shops of the Côte d'Azur town of Cannes, banners with the logos of Motorola (MOT), Royal Philips Electronics (PHG), palmOne (PLMO), and Samsung fluttered from the masts of plush yachts moored in the harbor. On board, top execs hosted nonstop sales meetings during the day and champagne dinners at night to push their latest wireless gadgets. Outside the city's convention hall, carnival barkers, clowns on stilts, and vivacious models with bright red wigs lured passersby into flashy exhibits. For anyone in the telecom industry wanting to shout their achievements to the world, there was no more glamorous spot than the sprawling 3GSM World Congress in Southern France in February.

Yet many of the most intriguing product launches in Cannes took place far from the limelight. HTC Corp., a red-hot developer of multimedia handsets, didn't even have its own booth. Instead, the Taiwanese company showed off its latest wireless devices alongside partners that sell HTC's models under their own brand names. Flextronics Corp. demonstrated several concept phones exclusively behind closed doors. And Cellon International rented a discrete three-room apartment across from the convention center to unveil its new devices to a steady stream of telecom executives. The new offerings included the C8000, featuring eye-popping software. Cradle the device to your ear and it goes into telephone mode. Peer through the viewfinder and it automatically shifts into camera mode. Hold the end of the device to your eye and it morphs into a videocam.

HTC? Flextronics? Cellon? There's a good reason these are hardly household names. The multimedia devices produced from their prototypes will end up on retail shelves under the brands of companies that don't want you to know who designs their products. Yet these and other little-known companies, with names such as Quanta Computer, Premier Imaging, Wipro Technologies (WIT), and Compal Electronics, are fast emerging as hidden powers of the technology industry.

They are the vanguard of the next step in outsourcing -- of innovation itself. When Western corporations began selling their factories and farming out manufacturing in the '80s and '90s to boost efficiency and focus their energies, most insisted all the important research and development would remain in-house.

But that pledge is now passé. Today, the likes of Dell (DELL), Motorola, (MOT) and Philips are buying complete designs of some digital devices from Asian developers, tweaking them to their own specifications, and slapping on their own brand names. It's not just cell phones. Asian contract manufacturers and independent design houses have become forces in nearly every tech device, from laptops and high-definition TVs to MP3 music players and digital cameras. "Customers used to participate in design two or three years back," says Jack Hsieh, vice-president for finance at Taiwan's Premier Imaging Technology Corp., a major supplier of digital cameras to leading U.S. and Japanese brands. "But starting last year, many just take our product. Because of price competition, they have to."

While the electronics sector is furthest down this road, the search for offshore help with innovation is spreading to nearly every corner of the economy. On Feb. 8, Boeing Co. (BA) said it is working with India's HCL Technologies to co-develop software for everything from the navigation systems and landing gear to the cockpit controls for its upcoming 7E7 Dreamliner jet. Pharmaceutical giants such as GlaxoSmithKline (GSK) and Eli Lilly (LLY)are teaming up with Asian biotech research companies in a bid to cut the average $500 million cost of bringing a new drug to market. And Procter & Gamble Co. (PG) says it wants half of its new product ideas to be generated from outside by 2010, compared with 20% now.

Competitive Dangers

Underlying this trend is a growing consensus that more innovation is vital -- but that current R&D spending isn't yielding enough bang for the buck. After spending years squeezing costs out of the factory floor, back office, and warehouse, CEOs are asking tough questions about their once-cloistered R&D operations: Why are so few hit products making it out of the labs into the market? How many of those pricey engineers are really creating game-changing products or technology breakthroughs? "R&D is the biggest single remaining controllable expense to work on," says Allen J. Delattre, head of Accenture Ltd.'s (ACN) high-tech consulting practice. "Companies either will have to cut costs or increase R&D productivity."

The result is a rethinking of the structure of the modern corporation. What, specifically, has to be done in-house anymore? At a minimum, most leading Western companies are turning toward a new model of innovation, one that employs global networks of partners. These can include U.S. chipmakers, Taiwanese engineers, Indian software developers, and Chinese factories. IBM (IBM) is even offering the smarts of its famed research labs and a new global team of 1,200 engineers to help customers develop future products using next-generation technologies. When the whole chain works in sync, there can be a dramatic leap in the speed and efficiency of product development.

The downside of getting the balance wrong, however, can be steep. Start with the danger of fostering new competitors. Motorola hired Taiwan's BenQ Corp. to design and manufacture millions of mobile phones. But then BenQ began selling phones last year in the prized China market under its own brand. That prompted Motorola to pull its contract. Another risk is that brand-name companies will lose the incentive to keep investing in new technology. "It is a slippery slope," says Boston Consulting Group Senior Vice-President Jim Andrew. "If the innovation starts residing in the suppliers, you could incrementalize yourself to the point where there isn't much left."

Such perceptions are a big reason even companies that outsource heavily refuse to discuss what hardware designs they buy from whom and impose strict confidentiality on suppliers. "It is still taboo to talk openly about outsourced design," says Forrester Research Inc. (FORR) consultant Navi Radjou, an expert on corporate innovation.

The concerns also explain why different companies are adopting widely varying approaches to this new paradigm. Dell, for example, does little of its own design for notebook PCs, digital TVs, or other products. Hewlett-Packard Co. (HPQ) says it contributes key technology and at least some design input to all its products but relies on outside partners to co-develop everything from servers to printers. Motorola buys complete designs for its cheapest phones but controls all of the development of high-end handsets like its hot-selling Razr. The key, execs say, is to guard some sustainable competitive advantage, whether it's control over the latest technologies, the look and feel of new products, or the customer relationship. "You have to draw a line," says Motorola CEO Edward J. Zander. At Motorola, "core intellectual property is above it, and commodity technology is below."

Wherever companies draw the line, there's no question that the demarcation between mission-critical R&D and commodity work is sliding year by year. The implications for the global economy are immense. Countries such as India and China, where wages remain low and new engineering graduates are abundant, likely will continue to be the biggest gainers in tech employment and become increasingly important suppliers of intellectual property. Some analysts even see a new global division of labor emerging: The rich West will focus on the highest levels of product creation, and all the jobs of turning concepts into actual products or services can be shipped out. Consultant Daniel H. Pink, author of the new book *A Whole New Mind*, argues that the "left brain" intellectual tasks that "are routine, computer-like, and can be boiled down to a spec sheet are migrating to where it is cheaper, thanks to Asia's rising economies and the miracle of cyberspace." The U.S. will remain strong in "right brain" work that entails "artistry, creativity, and empathy with the customer that requires being physically close to the market."

You can see this great divide already taking shape in global electronics. The process started in the 1990s when Taiwan emerged as the capital of PC design, largely because the critical technology was standardized, on Microsoft Corp.'s (MSFT) operating system software and Intel Corp.'s (INTC) microprocessor. Today, Taiwanese "original-design manufacturers" (ODMS), so named because they both design and assemble products for others, supply some 65% of the world's notebook PCs. Quanta Computer Inc. alone expects to churn out 16 million notebook PCs this year in 50 different models for buyers that include Dell, Apple Computer (AAPL), and Sony (SNE).

Now, Taiwanese ODMs and other outside designers are forces in nearly every digital device on the market. Of the 700 million mobile phones expected to be sold worldwide this year, up to 20% will be the work of ODMs, estimates senior analyst Adam Pick of the El Segundo (Calif.) market research firm

iSuppli Corp. About 30% of digital cameras are produced by ODMs, 65% of MP3 players, and roughly 70% of personal digital assistants (PDAs). Building on their experience with PCs, they're increasingly creating recipes for their own gizmos, blending the latest advances in custom chips, specialized software, and state-of-the-art digital components. "There is a lot of great capability that has grown in Asia to develop complete products," says Doug Rasor, worldwide strategic marketing manager at chipmaker Texas Instruments Inc. TI often supplies core chips, along with rudimentary designs, and the ODMs take it from there. "They can do the system integration, the plastics, the industrial design, and the low-cost manufacturing, and they are happy to put Dell's name on it. That is a megatrend in the industry," says Rasor.

Taiwan's ODMs clearly don't regard themselves as mere job shops. Just ask the top brass at HTC, which creates and manufactures smart phones for such wireless service providers as Vodafone and Cingular as well as equipment makers it doesn't identify. "We know this kind of product category a lot better than our customers do," says HTC President Peter Chou. "We have the capability to integrate all the latest technologies. We do everything except the Microsoft operating system."

Or stop in to Quanta's headquarters in the Huaya Technology Park outside Taipei. Workers are finishing a dazzling structure the size of several football fields, with a series of wide steps leading past white columns supporting a towering Teflon-and-glass canopy. It will serve as Quanta's R&D headquarters, with thousands of engineers working on next-generation displays, digital home networking appliances, and multimedia players. This year, Quanta is doubling its engineering staff, to 7,000, and its R&D spending, to $200 million.

Why? To improve its shrinking profit margins -- and because foreign clients are demanding it. "What has changed is that more customers need us to design the whole product," says Chairman Barry Lam. For future products, in fact, "it's now difficult to get good ideas from our customers. We have to innovate ourselves."

Sweeping Overhaul
India is emerging as a heavyweight in design, too. The top players in making the country world-class in software development, including HCL and Wipro, are expected to help India boost its contract R&D revenues from $1 billion a year now to $8 billion in three years. One of Wipro's many labs is in a modest office off dusty, congested Hosur Road in Bangalore. There, 1,000 young engineers partitioned into brightly lit pods jammed with circuit boards, chips, and steel housings hunch over 26 development projects. Among them is a hands-free telephone system that attaches to the visor of a European sports car. At another pod, designers tinker with a full dashboard embedded with a satellite navigation system. Inside other Wipro labs in Bangalore, engineers are designing prototypes for everything from high-definition TVs to satellite set-top boxes.

Perhaps the most ambitious new entrant in design is Flextronics. The manufacturing behemoth already builds networking gear, printers, game consoles, and other hardware for the likes of Nortel Networks (NT), Xerox (XRX), HP, Motorola, and Casio Computer. But three years ago, it started losing big cell-phone and PDA orders to Taiwanese ODMs. Since then, CEO Michael E. Marks has shelled out more than $800 million on acquisitions to build a 7,000-engineer force of software, chip, telecom, and mechanical designers scattered from India and Singapore to France and Ukraine. Marks's splashiest move was to pay an estimated $30 million for frog design Inc., the pioneering Sunnyvale (Calif.) firm that helped design such Information Age icons as Apple Computer Inc.'s original Mac in 1984. So far, Flextronics has developed its own basic platforms for cell phones, routers, digital cameras, and imaging devices. His goal is to make Flextronics a low-cost, soup-to-nuts developer of consumer-electronics and tech gear.

Marks has an especially radical take on where all this is headed: He believes Western tech conglomerates are on the cusp of a sweeping overhaul of R&D that will rival the offshore shift of manufacturing. In the 1990s, companies like Flextronics "completely restructured the world's electronics manufacturing," says Marks. "Now we will completely restructure design." When you get down to it, he argues, some 80% of engineers in product development do tasks that can easily be outsourced -- like translating prototypes into workable designs, upgrading mature products, testing quality, writing user manuals, and qualifying parts vendors. What's more, most of the core technologies in today's digital gadgets are available to anyone. And circuit boards for everything from cameras to network switches are becoming simpler because more functions are embedded on semiconductors. The "really hard technology work" is migrating to chipmakers such as Texas Instruments, Qualcomm (QCOM), Philips, Intel, and Broadcom (BRCM), Marks says. "All electronics are on the same trajectory of becoming silicon surrounded by plastic."

Why then, Marks asks, should Nokia (NOK), Motorola, Sony-Ericsson, Alcatel (ALA), Siemens (SI), Samsung, and other brand-name companies all largely duplicate one another's efforts? Why should each spend $30 million to develop a new smartphone or $200 million on a cellular base station when they can just buy the hardware designs? The ultimate result, he says: Some electronics giants will shrink their R&D forces from several thousand to a few hundred, concentrating on proprietary architecture, setting key specifications, and managing global R&D teams. "There is no doubt the product companies are going to have fewer people design stuff," Marks predicts. "It's going to get ugly."

Granted, Marks's vision is more than a tad extreme. True, despite the tech recovery, many corporate R&D budgets have been tightening. HP's R&D spending long hovered around 6% of sales, but it's down to 4.4% now. Cisco Systems' (CSCO) R&D budget has dropped from its old average of 17% to 14.5%. The numbers also are falling at Motorola, Lucent Technologies (LU), and Ericsson. In November, Nokia Corp. said it aims to trim R&D spending from 12.8% of sales in 2004 to under 10% by the end of 2006.

Close to the Heart
Still, most companies insist they will continue to do most of the critical design work -- and have no plans to take a meat ax to R&D. A Motorola spokesman says it plans to keep R&D spending at around 10% for the long term. Lucent says its R&D staff should remain at about 9,000, after several years of deep cuts. And while many Western companies are downsizing at home, they are boosting hiring at their own labs in India, China, and Eastern Europe. "Companies realize if they want a sustainable competitive advantage, they will not get it from outsourcing," says President Frank M. Armbrecht of the Industrial Research Institute, which tracks corporate R&D spending.

Companies also worry about the message they send investors. Outsourcing manufacturing, tech support, and back-office work makes clear financial sense. But ownership of design strikes close to the heart of a corporation's intrinsic value. If a company depends on outsiders for design, investors might ask, how much intellectual property does it really own, and how much of the profit from a hit product flows back into its own coffers, rather than being paid out in licensing fees? That's one reason Apple Computer lets the world know it develops its hit products in-house, to the point of etching "Designed by Apple in California" on the back of each iPod.

Yet some outsourcing holdouts are changing their tune. Nokia long prided itself on developing almost everything itself -- to the point of designing its own chips. No longer. Given the complexities of today's technologies and supply chains, "nobody can master it all," says Chief Technology Officer Pertti Korhonen. "You have to figure out what is core and what is context." Lucent says outsourcing some development makes sense so that its engineers can concentrate on next-generation technologies. "This frees up talent to work on new product lines," says Dave Ayers, vice-president for platforms and engineering. "Outsourcing isn't about moving jobs. It's about the flexibility to put resources in the right places at the right time."

It's also about brutal economics and the relentless demands of consumers. To get shelf space at a Best Buy (BBY) or Circuit City often means brand-name companies need a full range of models, from a $100 point-and-shoot digital camera with 2 megapixels, say, to a $700 8-megapixel model that doubles as a videocam and is equipped with a powerful zoom lens. On top of this, superheated competition can reduce hit products to cheap commodities within months. So they must get out the door fast to earn a decent margin. "Consumer electronics have become almost like produce," says Michael E. Fawkes, senior vice-president of HP's Imaging Products Div. "They always have to be fresh."

Such pressures explain outsourcing's growing allure. Take cell phones, which are becoming akin to fashion items. Using a predesigned platform can shave 70% of development costs off a new model, estimates William S. Wong, a senior vice-president for marketing at Cellon. That can be a huge savings. As a rule of thumb, it takes around $10 million and up to 150 engineers to develop a new cell phone from scratch. If Motorola or Nokia guess wrong about the market trends a year into the future, they can lose big. So they must develop several versions.

With most of its 800 engineers in China and France, Cellon creates several basic designs each year and spreads the costs among many buyers. It also has the technical expertise to morph that basic phone into a bewildering array of models. Want a 2-megapixel camera module instead of 1-megapixel? Want to include a music player, or change the style from a gray clamshell to a flaming-red candy-bar shape? No problem: Cellon engineers can whip up a prototype, run all the tests, and get it into mass production in a Chinese factory in months.

Moving Up the Food Chain

Companies are still figuring out exactly what to outsource. PalmOne Inc.'s collaboration with Taiwan's HTC on its popular Treo 650 smart phone illustrates one approach. Palm has long hired contractors to assemble hardware from its own industrial designs. But in 2001, it decided to focus on software and shifted hardware production to Taiwanese ODMs. PalmOne designers still determine the look and feel of the product, pick key components like the display and core chips, and specify performance requirements. But HTC does much of the mechanical and electrical design. "Without a doubt, they've become a part of the innovation process," says Angel L. Mendez, senior global operations vice-president at palmOne. "It's less about outsourcing and more about the collaborative way in which design comes together." The result: PalmOne has cut months off of development times, reduced defects by 50%, and boosted gross margins by around 20%.

Hewlett-Packard, a company with such a proud history of innovation that its advertising tag line is simply "invent," also works with design partners on all the hardware it outsources. "Our strategy is now to work with global networks to leverage the best technologies on the planet," says Dick Conrad, HP's senior vice-president for global operations. According to iSuppli, HP is getting design help from Taiwan's Quanta and Hon Hai Precision for PCs, Lite-On for printers, Inventec for servers and MP3 players, and Altek for digital cameras. HP won't identify specific suppliers, but it says the strategy has brought benefits. Conrad says it now takes 60% less time to get a new concept to market. Plus, the company can "redeploy our assets and resources to higher value-added products" such as advanced printer inks and sophisticated corporate software, he says.

How far can outsourced design go? When does it get to the point where ODMs start driving truly breakthrough concepts and core technologies? It's not here yet. Distance is one barrier. "To be a successful product company requires intimacy with the customer," says Azim H. Premji, chairman of India's Wipro. "That is very hard to offshore in fast-changing markets." Another hurdle is that R&D spending by ODMs remains relatively low. Even though Premier develops most of its own cameras and video projectors, "the really core technology," such as the digital signal processors, is invented in the U.S., says vice-president Hsieh. Premier's latest wallet-size video projector, for example, was based on a rough design by Texas Instruments, developer of the core chip. With margins shrinking fast in the ODM business, however, Premier and other Taiwanese companies know they need to move up the innovation food chain to reap higher profits.

That's where Flextronics and its design acquisitions could get interesting. Inside frog's hip Sunnyvale office, designers are working to create a radically new multimedia device, for an unnamed corporate client, that won't hit the market until 2007. The plan, says Patricia Roller, frog's co-CEO, is to use Flextronics software engineers in Ukraine or India to develop innovative applications, and for Flextronics engineers to design the working prototype. Flextronics then would mass-produce the gadgets, probably in China.

Who will ultimately profit most from the outsourcing of innovation isn't clear. The early evidence suggests that today's Western titans can remain leaders by orchestrating global innovation networks. Yet if they lose their technology edge and their touch with customers, they could be tomorrow's great shrinking conglomerates. Contractors like Quanta and Flextronics that are moving up the innovation ladder, meanwhile, have a shot at joining the world's leading industrial players. What is clear is that an army of in-house engineers no longer means a company can control its fate. Instead, the winners will be those most adept at marshaling the creativity and skills of workers around the world.