CAN EUROPE SURVIVE THE CHIP WARS?

Under fire from the U.S. and Japan, the Continent's industry gives up on going it alone

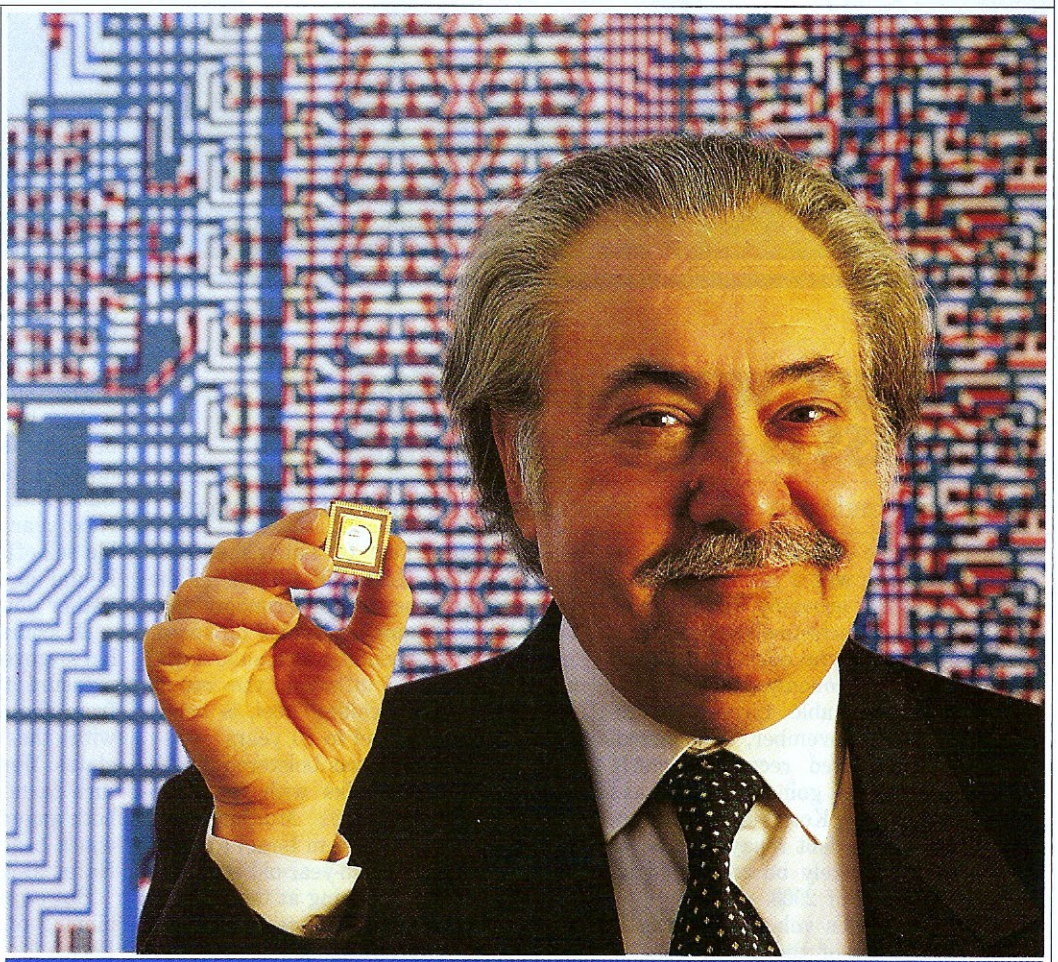
Only a few years ago, Heinz Hagmeister had big dreams for Europe's struggling semiconductor industry. Along with his fellow Europeans, the chairman of Philips Electronics' chip division vowed to break American and Japanese hegemony with the help of high tariffs, research subsidies, and tough local-content rules. But that formula only compelled U. S. and Japanese rivals to fight harder. Today, the world's chip leaders span the European Community from Scotland to Italy, pumping billions into new factories, chip-design centers, and engineering staff. With forces massing against the Europeans on their own turf, "we realize we can't do it all and have to rethink our strategies," says Hagmeister.

The battle brewing in Europe's $12 billion chip market could shape the global industry for the next era. And it could dash once and for all Hagmeister's and others' hopes for a fully independent technology base. Europeans have already been trounced by Japan in most types of memory chips and by the U. S. in microprocessors, two of the biggest product segments. In a last-ditch attempt, Europeans are scaling back ambitions and seeking alliances with American and Asian partners, who already have been teaming up with each other for years. But if these strategies fail, Europe's position as a power player in chips could atrophy to a niche role by the end of the decade.

The Europeans aren't crying uncle yet. Dutch leader Philips, Germany's Siemens, and Franco-Italian SGS-Thomson Microelectronics, often backed by heavy government subsidies, have too much at stake. More than just a bid to recover Europe's dwindling chip market share, they say their survival is crucial to prevent some $215 billion worth of European-made phone switches, TVs, and other electronic gear from sliding into dangerous dependence on foreign suppliers of vital technology.

HEAVYWEIGHT. But as costs for new technology and manufacturing soared out of reach and losses piled up, their combined world market share has dropped from more than 15% in the early 1980s to 10.6% last year (charts). To stanch huge losses, Philips and Siemens have cut back in memory chips and other cash-guzzling commodities. Instead, they're focusing on narrower targets where they're still strong, such as specialty circuits for communications and consumer electronics—the same technologies their parents' product units need to remain healthy and independent. Siemens' 1990 agreement to develop future technology with IBM—extended to Toshiba Corp. just last summer—is now cited as the Continental model of things to come.

Only SGS-Thomson still holds on to the goal of becoming a full-range global heavyweight. In mid-November, it got a boost when its French and Italian gov-



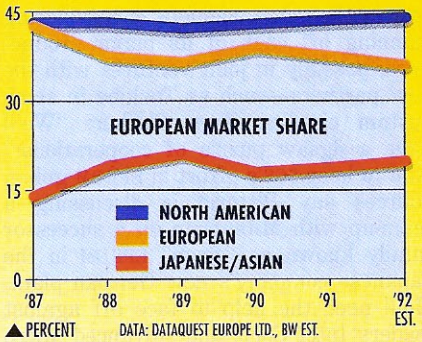
SGS-THOMSON'S PISTORIO: EVEN EUROPE'S LAST BEST HOPE IS SEEKING FOREIGN PARTNERS

GUGLIELMO DE MICHELI/GRAZIA NERI

EUROPE'S CHIPMAKERS FACE BLISTERING COMPETITION...

	1991 RANK/SALES MILLIONS EUROPE		WORLD	
PHILIPS NETHERLANDS	1	$1,144	10	$2,022
SIEMENS GERMANY	2	970	16	1,263
SGS-THOMSON FRANCE	3	855	13	1,436
MOTOROLA U.S.	4	776	4	3,802
INTEL U.S.	5	765	3	4,019
TEXAS INSTRUMENTS U.S.	6	632	6	2,738
TOSHIBA JAPAN	7	$441	2	$4,579
NEC JAPAN	8	405	1	4,774
NATIONAL U.S.	9	400	11	1,602
AMD U.S.	10	294	17	1,226
HITACHI JAPAN	11	276	5	3,765
SAMSUNG KOREA	12	242	12	1,473

...AND ARE LOSING MARKET SHARE AT HOME



ernment owners agreed to kick in $1.8 billion of capital and research funds over the next five years. "This is the last chance for Europe to maintain an indigenous semiconductor industry," declares Robert R. Heikes, an industry consultant. But insiders admit that will only buy perhaps two to five years to find a foreign partner that can help double SGS's world market share to the 5% needed to be a global player.

As the Europeans turn outward for help, the opportunities—and the risks—for Americans and Japanese are growing. Players such as Texas Instruments Inc. and Mitsubishi Electric Corp. are clambering to do deals that could help boost their local sales. Others with no European fabrication facilities, such as Toshiba, Advanced Micro Devices, and Korea's Samsung, risk "rapid decline as better-positioned competitors gain the tactical advantage," warns Malcolm G. Penn, president of market researcher In-Stat Europe.

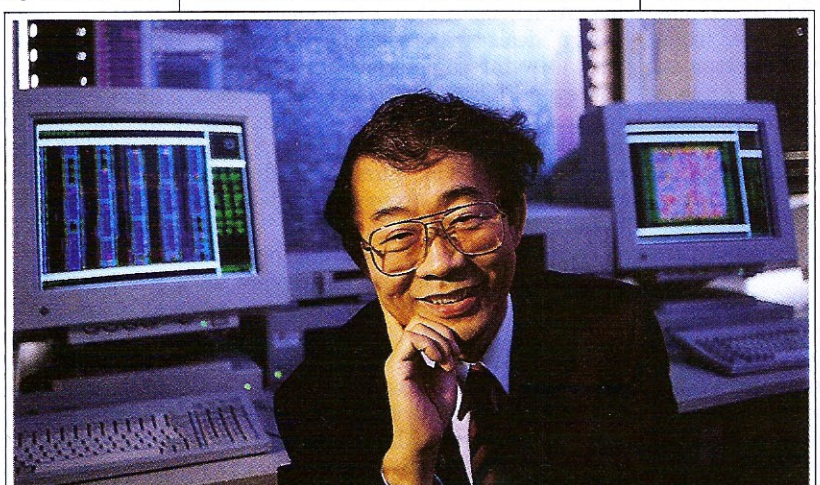
FEWER HANDOUTS. With the industry entering a new shakeout, the EC and national governments are increasingly powerless to interfere. Since the late 1980s, the EC had doggedly levied anti-dumping duties and fixed floor prices for Japanese and Korean memory chips, creating breathing room for European as well as American companies getting clobbered on price. But that, as well as local production rules and high import duties of 14%, only pushed companies such as Fujitsu, Hitachi, Mitsubishi, and Intel to set up shop inside the fortress.

At the same time, the EC's support for European chipmakers has taken a backseat to competing interests. To comply with the General Agreement on Tariffs & Trade, for example, the EC has agreed to reduce duties on imported integrated circuits by one-third, to 9%. And European chip users as well as the U. S. are pressuring the EC to phase out the remaining tariffs over the next few years, despite howls from European chipmakers that their costs are 10% to 20% higher than in the U. S. and Japan. "The authorities agree that semiconductors are important, but they're no longer in a position to intervene effectively," sighs Enrico Villa, a vice-president at SGS-Thomson. To add insult to injury, governments, pressed to create jobs, have even financed portions of new factories for Mitsubishi in Germany and Texas Instruments in Italy.

Government-backed research and development programs have also come up short. The $4.7 billion, seven-year Joint European Submicron Silicon Initiative (JESSI), launched in 1989 to bolster broad chip research, has been forced to retrench. Ever since Siemens defected from JESSI's flagship memory program to join IBM, and Philips pulled out of memories altogether in 1990, politicians have questioned funding for long-term chip-technology research. The knife fell late last year: JESSI's budget was cut by 20%, and the effort was refocused on projects with immediate market payoff, such as chip designs for specific products, including mobile phones. With some promising results, JESSI officials recently appealed for funding beyond the planned 1996 cutoff date. But allocations even for 1993 remain uncertain.

With an end to government handouts looming, Europe's chipmakers are working furiously to shape themselves up. In the past two years, SGS-Thomson has slashed payroll 25%, to 16,800, and built up a respectable 13% world market share in a memory-chip line called electrically programmable read-only memory, or EPROM—a position essential to keeping SGS on the cutting edge of technology for other chips. After losing $463 million since 1987, President Pasquale Pistorio expects to turn a small profit this year on sales of about $1.6 billion.

'NO ARGUMENT.' Siemens is toughening up, too. Estimated losses of about $300 million annually since 1990 in memory chips leave it no choice. Last May, it scrapped plans for a new factory for 64-megabit dynamic random-access memories (DRAM), signaling that it will no longer fight the Japanese and Koreans for market share after the current generation, now in production with IBM, winds down in the mid-1990s. Moreover, it will transfer all chip assembly from high-cost Bavaria to Singapore and Malaysia. By 1994, employment will decline 25%, from 15,000 in 1991. "There's no argument anymore," declares Chief Operating

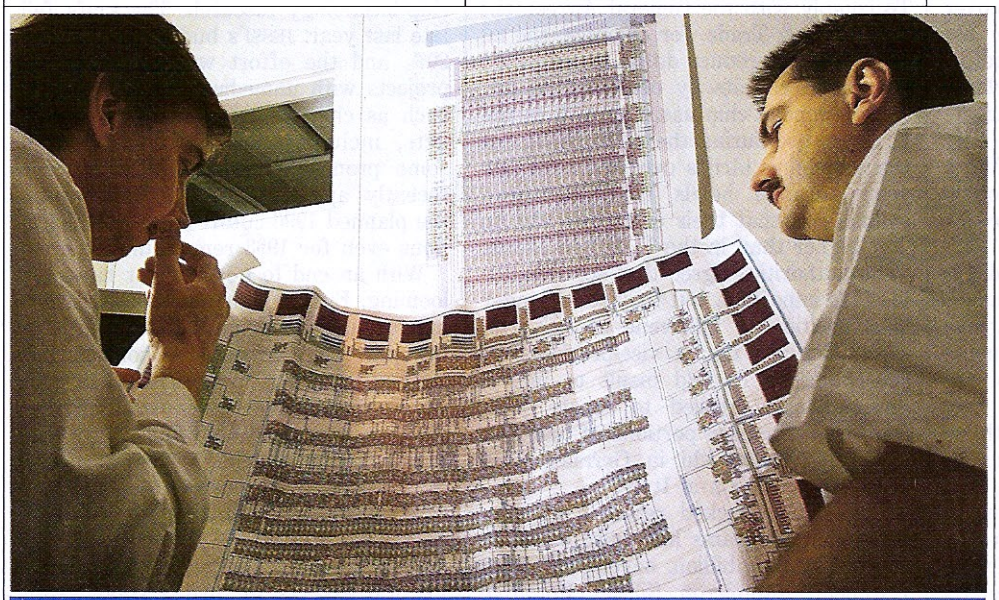


TOSHIBA'S KAWABATA: DEVELOPING FUTURE TECHNOLOGY WITH SIEMENS

PHOTOGRAPH BY MICHAEL DANNENMANN; GRAPHIC BY ROB DOYLE/BW

Officer Horst Fischer. "It's a matter of survival."

Indeed, by the mid-1990s, research and manufacturing for leading-edge chips, measuring a mere 0.3 micron, or one three-hundredth of the thickness of human hair, will cost some $1.5 billion. To stay in the game, Siemens is considering spinning off each of its major product lines, possibly in joint ventures with the best partners—such as Toshiba in semicustom circuits. Says Fischer: "We'll have a jigsaw puzzle of cooperations." And to keep SGS's effort in EPROM going, sources say Pistorio is discussing a team-up with Mitsubishi on a successor family known as "flash" EPROM in the Japanese company's new German plant. He'll need the help to face off against leaders Intel Corp. and Advanced Micro Devices, which are already in league, respectively, with Sharp Corp. and Fujitsu.



TI AND L.M. ERICSSON WILL DESIGN CHIPS IN SWEDEN AND MANUFACTURE THEM IN ITALY

Intra-European alliances may simply not be strong enough. SGS and Philips have joined forces on a new $600 million facility near Grenoble, France, to produce application-specific integrated circuits (ASIC) tailored for consumer, communications, and automotive electronics. But even that won't be enough without help from a low-cost maker of DRAMs, which will soon be mixed on the same chips with ASICs for such products as high-definition TV. For that, sources say the pair is talking to TI, whose $1.2 billion DRAM factory in Italy started production last April.

FRENZY. Beyond partnerships, Europe is banking on fast-growing ASICs to help turn the tide toward long-term profitability. By 1995, Dataquest Inc. forecasts the worldwide market for such chips, customized for mobile phones, auto fuel-injection systems, and the like, will more than double, to $13 billion. As customers attempt to pack more of their entire electronic systems on single slivers of silicon, chipmakers must become expert in how those products work. In this way, the wealth of knowledge that SGS, Philips, and Siemens draw from sister divisions in consumer, telecom, and industrial products could give them an edge in the market. Auto giant Daimler Benz had the same idea when it decided recently to unite five diverse chip houses under its Temic Telefunken unit and pump $2 billion into the group.

Trouble is, everybody else is pouncing on the same targets. "ASICs is no place to hide," warns Heikes. Take Motorola Inc. It has doubled European staff for designing automotive and communications chips in the past two years and recently put $125 million into expanding production in Britain. "This is our high-growth portfolio," says Senior Vice-President Barry Waite, who expects European revenues to grow 20% this year, or twice the market rate. To match the Europeans on systems knowhow, Motorola has struck up a slew of intimate joint-design deals with customers, such as with BMW for engine-control electronics, and even Philips' own consumer division for new multimedia players. Such partnerships are common in the U. S. but relatively new in Europe, and chipmakers are in a frenzy trying to tie them down.

Texas Instruments is setting the pace. In its strategy to become customers' in-house chip company, TI next year will install and manage a pilot chip line at phone switchmaker L. M. Ericsson's Stockholm labs. Once designs are fine-tuned, manufacturing data will be shipped electronically to TI's Italian plant for quick turnaround of volume production. Three or four more major TI customers may copy the model. "This vertically integrated *keiretsu* concept for Europe will be hard to beat," brags Roberto Schisano, president of Texas Instruments Europe.

While Americans are making the most headway, the Japanese are coming on strong. True, most of their recent investments, such as Fujitsu Ltd.'s $610 million "megafab" in northern England, target memory markets that they already control. But that depressed business is pushing them into ASICs, as well. Fujitsu, for example, has in the past year increased its staff of chip-design specialists in such hot telecom fields as digital mobile phones. NEC Corp. and Hitachi are pushing computer graphics and cordless phone chips specially designed to European standards. Toshiba Electronics Europe started assembling ASICs last spring at a sprawling site in northern Germany. And, says President Akio Kawabata, like the Americans, "we hope to gradually increase our design cooperation with European customers."

WAKING UP. They won't have to look very far. Motorola's Waite estimates that Japanese-made equipment in Europe, such as Sony TVs in Britain and Toshiba computers in Germany, will consume 20% of total European chip sales by the late 1990s, up from 5% today. Much of that business may well shift to Japanese chipmakers, taking their cues from Tokyo, as they build up local production. That's a threat to Europeans and especially to the Americans, who control 44% of the Continent's sales.

But the Americans and Japanese are well-positioned for the global game, having competed against and cooperated with each other for years. Today, they have global scale and strong technology bases, plus much experience with alliances and up-close customer relationships. In contrast, the Europeans are only now waking up to the fact that their attempt to create a protective cocoon hasn't worked. "The European Community's efforts to protect the domestic industry are now null and void," declares Dataquest researcher James Eastlake.

That leaves the Europeans with no choice but to keep pushing painful cost-cutting steps. At the same time, they will intensify the scramble for the right alliances and strategies. If they are successful, it could help justify billions in research subsidies and, more important, preserve a somewhat narrower but still healthy European technology base. But with rivals closing in at home, there's no more time to waste.

By Jonathan B. Levine in Paris

STIG-GORAN NILSSON