

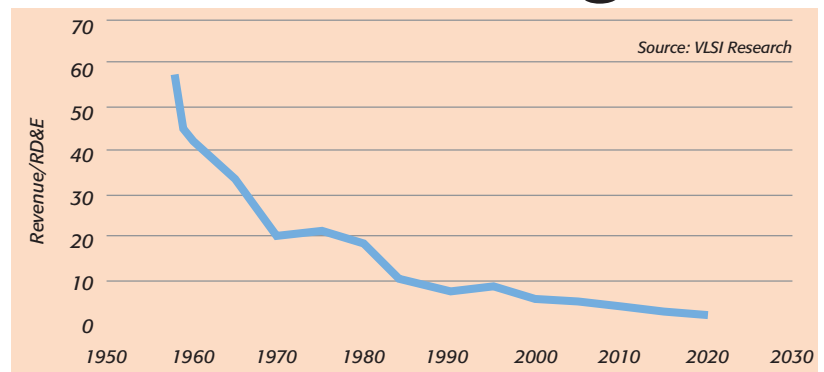
# Falling returns force change

THE RETURN that semiconductor companies make on their research and development spending has dropped dramatically, according to the head of technology at IBM.

In a keynote speech at the Globalpress Electronics Summit, in California in March, Dr Bernie Meyerson, an IBM fellow, vice president and the company's chief technology officer, said that in the 1960s a dollar of semiconductor R&D spending would bring \$40 of revenue. Now it returns just \$6.

It is a trend that has forced semiconductor companies to form partnerships to develop technology. IBM is already doing this in its alliance with Chartered Semiconductor, Samsung and Infineon Technologies on 65nm and 45nm process technologies.

Staff from Infineon are helping Chartered integrate a common 65nm process into its 300mm Fab 7 facility. Dr Walter Lange, field executive for systems solutions at IBM, said the



The revenue per dollar of research spend has fallen for the last 50 years

joint development work has been IBM's most successful technology transfer.

Part of the reason for needing alliances like this, according to Meyerson, is that device scaling can no longer be relied on to provide performance improvements.

Process features such as gate oxides, which can be as little as five atoms thick in leading processes, just do not scale much further. The variation in process parameters, such as

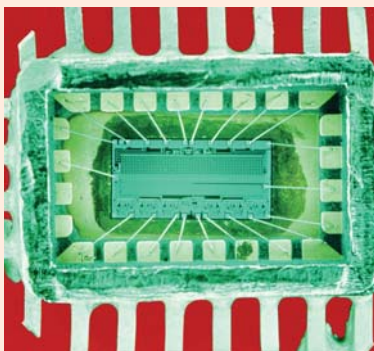
dopant concentrations, has become so great it is difficult to model effectively. Meyerson said designers need to take a holistic approach to their work, worrying about every aspect of their design at once. "If you don't optimise them all then you'll never get a result."

Meyerson claimed this 'holistic' approach has allowed IBM to produce prototype Power6 processors that run at between 4GHz and 5GHz, when rivals such as Intel gave up on the gigahertz race at around 3.5GHz.

## Consolidation 'needed' in the IP market

The semiconductor intellectual property business needs to consolidate to survive, according to speakers on a panel discussion at the recent Globalpress Electronics Summit in Monterey.

"The semiconductor IP industry is going through a maturation phase," said Larry Morrell, vice president and



IP suppliers may need to look at becoming chipmakers

general manager for IP products at memory technology developer Impinj. "IP suppliers will merge with fabless semiconductor companies."

Morrell pointed to the rising cost of validating IP in silicon as one reason why IP companies are looking for a safe harbour.

Warren Savage, president and CEO of IPextreme, which extracts semiconductor IP from large companies, packages it and licenses it on, said: "Small IP companies will inevitably die because they will not be able to keep up with the investment needed."

Savage said part of the problem for IP companies is the severe cost pressure they have faced, because buyers expect big discounts to offset the poor experience of IP

they might have had in the past.

Jack Browne, vice president of marketing at microprocessor core provider MIPS, struck one bright note. He said: "IP core lifecycles are much longer than for pure semiconductor products. So if you win a customer you'll probably get the follow-on business."

Morrell suggested one other way forward for IP suppliers: selling chips. "At deep submicron geometries there's a significant investment in making sure your IP works in silicon. If you've done the work to get the silicon working, why not sell the silicon? It baffles me why ARM has not produced parts."

Browne disagreed: "For MIPS it is really important that our customers know we're an IP company."