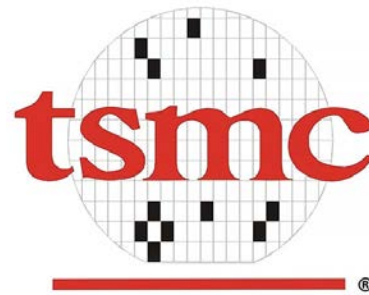


Semiconductor History being made in the 1980's

The founding of TSMC on February 21, 1987 marks an earthquake that would move the tectonic plates that formed the global structure of semiconductor industry. That earthquake was triggered by the formation of what would come to be called 'the pure-play foundry' by TSMC. Why it happened has to do with its unleashing three different pressure fronts that had formed across the industry.

— G. Dan Hutcheson, 2017

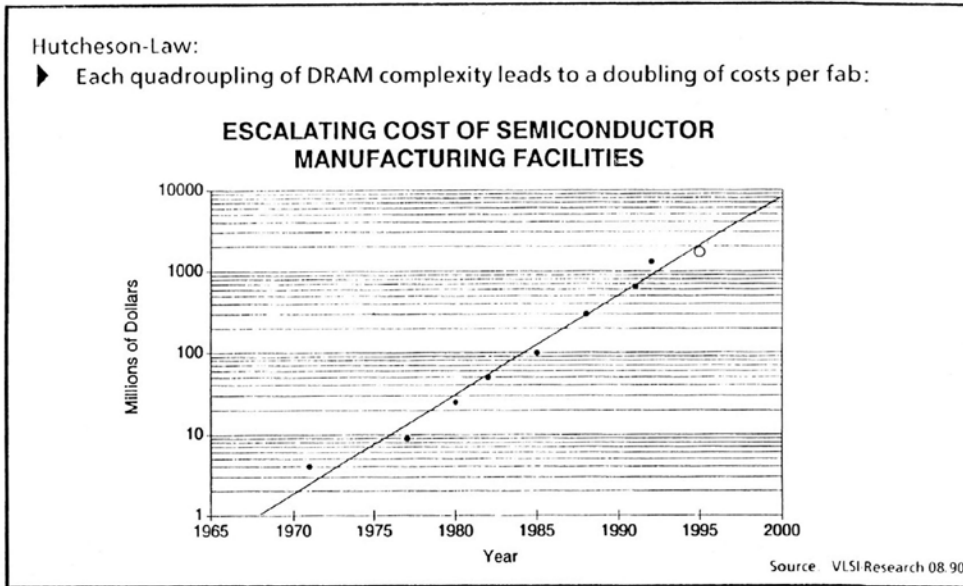


Time Line: February 21, 1987 - TSMC Founded

The founding of TSMC on February 21, 1987 marks an earthquake that would move the tectonic plates that formed the global structure of semiconductor industry. That earthquake was the formation of what would come to be called 'the pure-play foundry' based on Morris Chang's vision that the only way to build a business out of selling finished wafers to chip companies was to base it on the strict principle of never competing with a customer. Chang saw that the only to build customer trust was through the integrity of the company, which also relied heavily on his own personal integrity, having run Texas Instruments' semiconductor group. At the time he left a customers with a brochure stating, "TSMC Core Values: Integrity, Commitment, Innovation, and Customer Trust."

There had been companies that offered the services of their wafer fabs before. They typically did this in downturns when fab utilization was low. But then they would kick these customers' products off the wafer fab as soon as the market turned up. The reason was that they made far more money producing their own chips. Moreover, some of the fabbed companies that offered foundry services developed an unsavory reputation for copying the designs of their customers and then offering these as finished Integrated Circuits (ICs) of their own. This lack of trust and impossibility of building a business with partners like these was the first pressure front for TSMC's earthquake.

The second pressure front for the TSMC earthquake was the rising cost of wafer fabrication facilities. VLSIresearch had been published this rising cost, which had been under \$10M in the 70s and had just clipped \$100M around the time of TSMC's founding. The \$100M price tag for a leading edge fab put it out of the reach of venture capital funding. Even some of the largest semiconductor companies had become fearful of their ability to remain what we now call IDM, or 'Integrated Device Manufacturer,' as the slide from Siemens below shows from a 1992 SEMI ISS Europe presentation shows.



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The third pressure front for the TSMC earthquake was the development of EDA, or Electronic Design Automation, tools. This the big bang that separated design from fabrication. Before it, chip designers painstakingly carved out mask patterns from rbylith, holding the logical function of the chip in their heads as they rendered what would be a physical representation in silicon. EDA did all that, freeing chip designers from the messy process of having to fabricate the finished wafer. At the same time, it made it possible for the fables semiconductor business model to emerge by the mid-eighties.

Without all three pressure points focusing on the time around TSMC's founding, it is doubtful they would have been so successful. Especially given that all they had was NT\$ 1.38B in paid-in capital and a lease for a 3 to 2.5 micron 6-inch 6,615 Wafer-Start-per-Year capacity from the Ministry of Economic Affairs and ITRI. In addition to the start-ups that signed on, Philips and Ajit Manocha, played a critical role, putting up the largest portion of the capital (28%). Manocha's vision for Philips was that there had to be another way than to continue building their own fabs. He was right.