

## India, China exert inexorable pull

By Richard Wallace , [EE Times](#)

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Of the two main destinations for offshore design work, China may get the headlines, but India seems to be garnering the jobs. Between these two technology titans, India probably poses the more near-term, and larger, threat to Silicon Valley's dominance in electronics design engineering.

While the joint EE Times-ESM outsourcing survey suggests that most such work goes to U.S.-based consultancies, a substantial amount is done by engineers outside of the United States, increasingly in places like China and India. Does this suggest that Silicon Valley's backdoor has been left open and that its hegemony in electronics innovation is threatened? Don't be too quick to short U.S. chip makers.

Cost is a big factor driving design work to Asia, but it's far from the only one. The need to tap into booming new semiconductor applications in regional markets from Beijing to Bangalore is also driving U.S. chip makers offshore.

Indeed, the largest and fastest growth in nearly all vertical segments of electronics — from PCs to cell phones, wireless devices and consumer gear — is taking place outside the United States, especially in China, India and other parts of Asia.

Increasingly, design outsourcing is about gaining and preserving access to local talent, and thus ensuring access to future growth in these local markets, by doing what Silicon Valley does best: driving new ideas and innovations. At the same time, U.S. chip companies tend to hold on to the most creative, highest-value-add aspects of new design work, particularly the architectural definition and all high-level, conceptual design.

### **Ambitious giant**

China certainly has ambitions of becoming a technology giant, as clearly demonstrated by Shanghai-based Semiconductor Manufacturing International Corp.'s aggressive move into the foundry business. China is reported to have more than 500 design centers, many of them with Silicon Valley front offices. While still 10 years behind their U.S. counterparts in terms of advanced design techniques, according to most observers, China is doing a brisk business in design cost reduction.

Working from first-generation artwork on everything from bus controllers to graphics ICs, China's design shops refine and improve existing circuits and help systems builders in the United States drive existing products down the cost curve. Several major issues mitigate against a China design drain, however. The first is the still-unresolved matter of intellectual-property (IP) rights, a factor that makes U.S. companies reluctant to turn over advanced designs to China. The second is the lack of an advanced, secure design-engineering infrastructure.

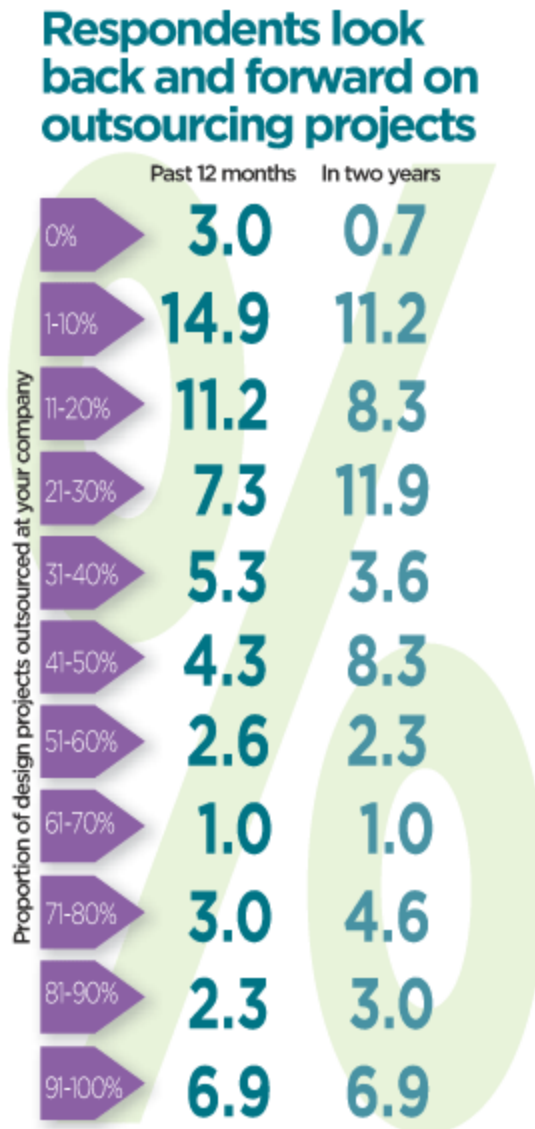
What China does have is a lot of small design shops, often running PCs with low-end layout tools.

China's design ambitions also face another, more subtle hurdle. "It's currently much more difficult to deploy in China because of the language and cultural differences," observed T.J. Rodgers,

president and CEO of Cypress Semiconductor Corp. The Silicon Valley chip maker is looking to open a design center in China (see story, page 18).

That's not the case in India.

Already a powerhouse in call center, IT and business process outsourcing, India has a well-developed, well-educated, English-speaking design-engineering community with very tight Silicon Valley connections. Superb computer and network architects, Indian engineers have contributed to some of the most complex product designs at companies like Intel, Sun and Cisco, among others.



Some of the most advanced EDA software tools in use today were designed by Indian engineers, and India itself has a well-developed, networked design infrastructure. The fully burdened cost of a design engineer is also much lower in India, about half the U.S. rate.

Nevertheless, "I think it's clear that when it comes to defining architectural concepts for the most advanced silicon and systems, all of this design work will still happen in Silicon Valley," said Pratul Shroff, president and CEO of eInfochips, one of the largest and fastest-growing full-service design-outsourcing firms in India. "The most advanced product concepts will always be designed

in the United States."

Pioneer Texas Instruments Inc. set up its first design center in India in 1986. Intel, National, Analog Devices, Philips Semiconductors, Cypress and many others have since followed. "Today TI has over 1,000 engineers in Bangalore," Shroff noted, guessing that "over 45 chips on an annual basis" are designed for TI in India.

U.S. semiconductor executives also give India's enlightened approach to IP protection high marks. Cypress CEO Rodgers, for example, isn't losing any sleep over the whereabouts of his company's intellectual property. "India respects IP," Rodgers said.

Compared with an approximate U.S. engineering cost of about \$1 per gate total for a typical chip, eInfochips comes in at "one-half to one-third of the cost," said Shroff. But he and others note that India's cost advantage is rapidly shrinking, driven both by a rising supply of engineering talent and by an increase in demand for that talent.

As for China and its growing designs on outsource and development opportunities, Shroff remains unfazed. Yes, China may have a cost advantage over India, but concerns about IP protection and lack of a robust design-engineering infrastructure work against it in a head-to-head matchup, in his view.



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