

U.S. risks losing nano lead

Nanotechnology experts warn the United States could lose its global lead in nanotechnology. To continue U.S. leadership, the government and the industry must adopt a host of proposals, including establishing environmental, health and safety guidelines for nanotech and investing more federal money.

In recent testimony before the House Science Subcommittee on Research, Sean Murdock, executive director of the NanoBusiness Alliance in New York City, said federal investment is vital to bridge the "valley of death" many nanotech companies face between their founding and their ability to draw significant cash flow.

"The National Science Foundation has estimated that the global impact of nanotechnology enabled products and services will be \$1 trillion by 2015," Murdock told committee members. "Many considered this estimate to be quite lofty when it was made in 2000 with the launch of the National Nanotechnology Initiative."

Murdock added that more recent estimates for the global impact of nanotechnology-enabled goods are even larger than the NSF's. "In Realis, a consulting group, has predicted that nanotech will impact up to \$2 trillion of global economic output, while Evolution Capital, an investment bank, estimates that the market will reach \$1 trillion 5 years earlier in 2010," he said.

The United States currently is the world leader in nanotechnology R&D spending, with roughly \$1 billion in federal funding and \$2 billion more when state and private investments are included. Still, although the U.S. government spends more in terms of raw numbers, it has fallen behind Asian competitors when their spending levels are corrected to reflect the difference in what a dollar buys there vs. here.

For instance, the \$130 million in estimated Chinese government nanotech spending last year equaled \$611 million in actual purchasing power, explained Matthew Nordan, vice president of research at Lux Research in New York. On this basis, he said, while the United States invested \$5.42 per capita in government nanotech spending last year, South Korea invested \$5.62, Japan \$6.30 and Taiwan \$9.40.

"The United States is currently ahead of the nanotechnology curve, but other nations continue to invest more and more time, energy and money in their nanotechnology efforts," said Rep. Bob Inglis, R-S.C., the subcommittee's chairman. "Our last stronghold of competition is innovation, and the United States cannot afford to lose the lead on this technology."

Nordan said the current lack of firm environmental, health and safety guidelines on novel nanoparticles reflects a well-intentioned unwillingness to rush to judgment before all the facts are in, but such a lack of guidance could cause unintended and even perverse effects.

"Based on our contact with individuals driving nanotech initiatives at America's largest corporations, it's clear to us that ambiguity surrounding environmental, health and safety regulation of nanoparticles is hampering commercialization. Firms do not want to play a game whose rules may change at any time," Nordan explained in his testimony.

"That doesn't mean they want more regulations or more onerous regulations," Nordan told UPI's Nano World. "They're just looking for a roadmap on how federal agencies such as the EPA or OSHA plan to approach nanoparticles." He recommended the U.S. government at least double the sums it currently allocates for nanotech environmental, health and safety research -- which total only 3.7 percent of the 2006 National Nanotechnology Initiative request.

The so-called valley of death many nascent companies face is particularly acute for nanotechnology,

Murdock said. "Most nanotech innovations require significant investment and platform development before any revenues can be generated because they are based upon fundamental breakthroughs in basic research at universities and federal labs," he said. Venture capitalists have shied away as a result, after getting burned by the dot-com bubble.

To help solve this problem, Murdock recommended federal investment in nanotech user facilities. "These facilities, in theory, provide access to critical and expensive equipment, and reduce the capital intensity of nanotech commercialization activity," he told the committee. "However, many nanotech start-ups lack the process knowledge and internal capabilities to make effective use of these investments. The government must also ensure sufficient operating funds to provide services and train the start-ups, or the assets will be underutilized and the investment will not generate the return we expect."

He also said the federal government should use its grant programs more fully and effectively to enhance commercialization. For instance, with the Small Business Innovation Research program, "Many member companies speak of the 'myth' of the SBIR Phase III -- the phase where innovations proved out in Phase II are supposed to be brought into use in the sponsoring agency," Murdock said.

He said he thinks more rapid incorporation of nanotech into government programs and purchases would be of greatest aid to companies.

"Rapid integration would generate a sustainable source of revenues, provide customer validation and feedback, and enable nanotech companies to gain critical scale-up manufacturing experience to ensure we can produce these critical technologies domestically," Murdock told Nano World. "Furthermore, doing so will ensure that our agencies, particularly Defense and Homeland Security, remain ahead of the world in terms of nanotech integration capabilities." Jim O'Connor, Motorola's vice president of intellectual property incubation and commercialization, warned about the shortage of skilled U.S. workers in science and technology.

"The United States is slipping behind our competitors -- Asia in particular -- in undergraduate and graduate training," he testified. "Simply put, we must have a well-educated talent pool to survive."

O'Connor noted that Motorola gave its support to the President's Council of Advisers on Science and Technology recommendation to build ties between the National Nanotechnology Initiative and the departments of Education and Labor to improve national technical proficiency in science, technology, engineering and math. "In addition, immigration policies have to be set to allow, at least in the near term, U.S.-trained graduates from foreign countries to stay and work here and in the longer term, a steady influx of new foreign students to come to the United States for their education," O'Connor said.

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