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The innovation burden must be shared

By ADAM SEGAL and JOHN YOCHELSON

Competitiveness is back on the Congressional agenda for the first time since the Japanese juggernaut of the 1980s produced a decade of soul-searching. Even in an extremely tight budget environment, bipartisan consensus is emerging in favour of priming the pump of US innovation through increased funding for basic research and development and scholarships in maths, engineering and the sciences. But top-down federal spending alone will not win the race for global leadership in science and technology. It will take a hands-on commitment from all involved in the US innovation enterprise to build world-class talent from the bottom up.

In contrast to the years when Japan was America's defining economic concern, today's competitive challenges have more to do with the relentless logic of globalisation than the policies and practices of any particular country. First, trade barriers do not loom as large as they once did. Aggressive market opening was the centrepiece of the US response to Japan in the 1980s and early 1990s. Since then, cross-border flows of goods, services and foreign direct investment have surged as much of the world has adopted more open, market-based economic policies. Today's core challenge does not stem from lack of market access but rather from the virtually unlimited availability of well-trained, low-cost knowledge workers outside the US.

Second, US companies are no longer behind the curve. Corporate America has largely put its competitive house in order, addressing deficiencies in quality and time-to-market that Japanese rivals exposed. Now the US system of education is under the microscope. The challenge is to improve the basic skills of primary and secondary students in maths and science, reverse declining interest in many technical fields and lessen reliance on foreign-born talent.

Third, the threat of industrial policy has faded. US innovation has replaced Japan Inc to become the world's model. China, India and others are racing to catch up in areas of longstanding American strength – higher education, science and technology infrastructure and individual entrepreneurship. Today's cause for concern is not that others are playing a different game but that they may beat us at our own.

Congress's response to these challenges relies on the same pumppriming that worked wonders in boosting education and R&D programmes after the launch of Sputnik. At an estimated cost of \$9bn per year, proposed new legislation calls for increased funding of basic research; the recruitment of 10,000 new science and maths teachers; and scholarships for 25,000 undergraduates and 5,000 graduate students a year in the physical

sciences, engineering and maths.

Yet, increased spending is not a stand-alone solution. For starters, federal agencies can do more with existing resources. The Government Accountability Office estimates that 13 agencies spent about \$2.8bn in 2004 on 207 largely unevaluated programmes designed to strengthen the pool of US technical talent. These disparate programmes must be coordinated.

At the same time, federal dollars alone are unlikely to shape the career choices of American students. Scholarships may be a factor for some but they cannot trump market forces. It will be a struggle to attract talent into science, engineering, and primary and secondary maths and science teaching as long as financial rewards remain low relative to other career options.

Above all, even well-conceived legislation cannot make science and maths come alive, provide mentors and role models or enrich a student's education with a research internship. Building human capital in science and technology, especially among fast-growing, historically under-represented groups, is up-close and personal. Results hinge on the grassroots engagement of educators, employers, professional societies, foundations and others.

The crown jewels of US education – research universities – bear a particular responsibility in developing homegrown talent. Having attracted the best and brightest from round the world for decades, they must now redouble their efforts to strengthen primary and secondary maths and science, reduce undergraduate attrition in technical majors and sustain graduate enrolments in the physical sciences and engineering. Georgia Tech's success in producing African-American engineers and Carnegie Mellon's in increasing the number of women in computer science show what can be achieved.

Equally, more US companies should treat their investments in education as rigorously as they do investments in product development and marketing. Many businesses view contributions to education mainly as an aspect of community relations. What a difference it would make if they made grants conditional on programme effectiveness and aligned their efforts to programmes that work.

The case for an integrated national strategy on innovation has never been more compelling. Federal resources have a pivotal role to play but they are no substitute for committed leadership at all levels across the country.

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