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Opinion

Sunday Forum: Supercomputing for the masses

Putting massive computational power into the hands of small businesses and institutions will revitalize American manufacturing, inventiveness and scientific advancement, according to computer expert STAN AHALT

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Pennsylvania's unemployment rate recently saw another increase. Lost and outsourced jobs remain an ongoing problem, especially for those working in the manufacturing sector. There is no simple fix for this problem, but supercomputing might be part of the answer.

Once the exclusive domain of a handful of well-funded companies, supercomputing is increasingly becoming accessible, scalable and affordable for companies of all sizes, budgets and needs. Within the past few weeks, the technological marvel that first enabled a machine to triumph over humanity's greatest chess player can now be had from the company that has become the dominant name in desktop computing.

At this summer's International Supercomputing Conference in Dresden, Germany, Microsoft announced its rollout of high-performance computing for an amazing out-of-the-box price of $50,000 -- a fraction of its cost decades ago. While it is a late-entry player in the market, Microsoft's vision is that smaller companies will soon see the need and benefits of supercomputing.

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What does supercomputing for the masses mean? Certainly not long lines like those that awaited the iPhone, but its development marks a supercomputing milestone that could result in enormous mainstream benefits, including revitalization of the ailing manufacturing sector.

Researchers, academics and engineers from smaller organizations will be able to tap into vastly increased computing power to test hypotheses, prototype products, cut production costs and design better processes for everything from assembly lines to document tracking. The consequence will be a full-spectrum surge of innovation and scientific advancement.

Long before Microsoft's announcement, high-performance computing already was moving beyond its traditional functions in meteorology and astrophysics. The Pringles factory takes advantage of supercomputing aerodynamic analysis to improve the way potato chips fly off the assembly line. Supercomputing simulations have reduced the amount of money that Goodyear has spent on physical tire prototypes by up to 40 percent. Golf-club manufacturer Ping is using supercomputing to simulate and test new designs.

The engineers behind these applications know that supercomputers are fast becoming the best way to perform that quintessential American task: to make it better and make it faster.

Supercomputers can help create new markets, new opportunities and new jobs here in the United States. Simulation makes choosing between alternative processing methods far easier. Better analysis and documentation of capabilities helps with efficiency. Improved factory and workflow layouts increase productivity. All of these factors can dramatically improve a company's bottom line and increase its competitive edge in the global marketplace -- and they will play an increasingly crucial role in maintaining the competitiveness of American industry.

Admittedly, many rust-belt companies aren't well positioned to dive into the supercomputing revolution on their own. That's why programs like the Blue Collar Computing Initiative are helping small- and medium-sized businesses adopt supercomputing tools. This program already has helped bring together such unlikely couples as the Ohio Supercomputer Center and the Edison Welding Institute.

With access to high-performance computing tools, welders can test a design in minutes, make changes and test it again -- without ever heading down to the metal shop. Mask and torch weld designs could soon become a thing of the past. With more computing horsepower for design simulations, engineers can be bolder and more inventive, while avoiding the endless repetition of trial-and-error prototypes. The freedom to branch out from proven, safe solutions will be vital for exciting breakthroughs in the next decades.

Recognizing the amazing potential of supercomputing technology, Congress is now considering legislation that would expand the successful Blue Collar Computing Initiative and help reduce the risk to companies willing to take a leap into the technological future. Republican Sen. George Voinovich and Democratic Rep. Tim Ryan are leading a bipartisan effort to make high-performance computing resources more widely available to small businesses and manufacturers. Anyone concerned about America's ever-rising trade deficit and shrinking manufacturing base should give this legislation serious consideration.

This effort would pave the way for new supercomputing centers to be created across the country. These centers would assist small businesses in finding areas where supercomputing could help them stay competitive, as well as develop software specifically designed to meet the needs of small businesses.

Without a serious push into new technologies like supercomputing, the United States is likely to see continued erosion in its industrial sector. Supercomputing can help us compete through brains, not brawn.

It also can help revitalize the nation's leadership in the critical areas of computational science, engineering and product design. Without smart intervention now, we'll be left lagging as other countries leapfrog ahead using affordable, powerful computing to increase their efficiency and maximize the impact of innovative thinking.

Just as the ATM has replaced the bank teller, desktop supercomputing simulations soon will begin replacing physical testing labs and transforming old-fashioned heavy industry into light, adaptable and efficient businesses for the future.

The democratization of supercomputing is happening. Is American enterprise ready?

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