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The Next Generation of Computer Geeks

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A booth for Skolkovo at the St. Petersburg International Economic Forum. **Scott Rose**

Editor's Note: This is the second of five articles about President Medvedev's efforts to modernize the economy.

Anna Andreyeva seems like an average teenager at first. At 16, she's a bit dorky and shy but already has what it takes to be a Russian beauty: long, light ash-brown hair, blue eyes and a lean physique.

Andreyeva, however, is not your typical teenager. She is the winner of 13 academic competitions, or "Olympiads," among high-school students and was presented at a meeting of the Russian Rectors' Union last month as the future of Russia's IT industry.

Russian authorities, educators and employers are betting on teenagers like Andreyeva whom they believe will be the generation of intellectuals that can help transform Russia's natural resource-based economy into one based on innovation.

In June of last year, President Dmitry Medvedev instituted the presidential commission on modernization and outlined five key priority areas for modernizing the Russian economy: medical technology and pharmaceuticals, computer technology and programming, energy efficiency and renewable resources, space technologies and communications, and nuclear technologies.

But while developing many of the sectors depends on deploying large quantities of capital for the infrastructure, facilities and technology necessary to bring them into the 21st century, modernizing the information technology sector means deploying a large amount of human capital — training an army of young, highly qualified personnel to be the innovative engines of the new economy.

Geek Shortage

In theory, Russia should have no shortage of young, IT-savvy personnel to help build an innovative economy.

Russian youth routinely dominate international technology competitions, such as the ACM International Collegiate Programming Contest, where Russian universities have won five of the last 10 contests.

Andrei Ternovsky became the darling of the tech industry last year after creating the popular video chat web site Chatroulette when he was just 17 years old. The web site, which randomly pairs strangers in a video chat, has soared in popularity, and Ternovsky has been courted by investors the world over.

But despite success stories like Ternovsky, the supply of IT specialists currently falls way behind demand.

"Russia lacks IT specialists," said Boris Nuraliyev, director of software company 1C. "Even compared with countries where the IT industry is not a priority, we lag behind," he said.

A much smaller percentage of Russians are employed as IT specialists than in other developed economies, according to a study by the Information & Computer Technologies Industry Association, where Nuraliyev is a committee chairman.

In 2009, Russia employed a little over 1 million IT specialists, accounting for 1.34 percent of the country's labor force, compared with 3.74 percent in the United States, 3.16 percent in Britain and 3.14 percent in Germany, according to the study.

And while there are just enough IT jobs at the moment to place most of the trained IT specialists on the market, that will no longer be the case after the next couple of years.

Under optimistic scenarios for the development of the IT industry, "the number of specialists demanded in the coming years will exceed the number of graduates several-fold, and that shortage will be the main factor holding back the development of the country," the study said.

Education Goals

Andreyeva’s career plans are not set in stone yet, but she says she may study information

technology at Moscow State University or Moscow Institute of Physics and Technology.

Only two years ago, her parents (her father, Sergei Andreyev, is president and CEO of software firm ABBYY) encouraged her to consider going abroad for college, but recently they have turned their attention back to Russia. “Our education is no worse than theirs,” Andreyeva said.

But at the moment, only a handful of Russian institutes and universities are capable of producing the caliber of IT specialists required to compete on a global scale.

"Working at Google or Microsoft — this is the level the Russian Federation is asking from its IT specialists. Only 500 graduates a year currently satisfy these requirements," said Vladimir Vasilyev, rector of the National Research University of Information Technologies, Mechanics and Optics. He added that only 25 Russian universities were equipped to train students of that caliber.

For the government’s modernization agenda, that just isn’t going to cut it.

"If I remember our college course in philosophy well enough, we need about 10 to 15 percent of the total population to become innovative thinkers, if we want to see a real change in society," Education Minister Andrei Fursenko said at a recent session of the Russian Rectors' Union.

"Five hundred leaders in the IT industry per year for all of Russia is clearly not enough," Fursenko said.

But while policy-wise there are limitations to what can be done to amp up the number of students, there is much that can be done to increase the quality of IT education and the number of institutions able to supply it.

One way to increase those numbers may be to bring business into the mix. Getting IT companies involved in the education process may also help bridge the yawning gap between the skills needed for the contemporary IT workplace and those taught in colleges and universities.

"My perception is that today many [Russian IT specialists] have this plaque hanging on them that says 'Made in the U.S.S.R.' The fundamentals [of the Soviet education system] stayed on, but what is really lost is the connection between colleges and companies," said Alexander Galitsky, co-founder of Almaz Capital Partners.

While Russia’s IT talent is immense, it is dispersed and not easily harnessed for collective projects, he said.

"Russia already has an innovative environment, but it is underground. All those IT guys had been talking to each other long before talk about innovation," he said. "It is now important to physically unite this IT community in one space with infrastructure and walls."

Creating so-called corporate universities, such as those already in place at some oil and gas companies, may be one way to do that, said Viktor Sadovnichy, rector of Moscow State University. He added that Skolkovo, the site of Medvedev’s planned innovation hub, has the

potential to host such corporate universities.

Innovation City

Medvedev has envisioned Skolkovo as a Russian “Silicon Valley” — a place for high-tech firms, investors and educators to come together, thereby fostering innovation.

And the innovation hub has already landed some high-profile partners.

International technology firms Cisco and Nokia have already agreed to set up shop in Skolkovo, and Massachusetts Institute of Technology has agreed to participate in the hub’s academic center.

During Medvedev’s visit to the United States in June, MIT signed an agreement with the Skolkovo Foundation to assess opportunities for education and research with Russia's top universities and research institutes.

The Kremlin is ensuring that the Skolkovo project is equipped with enough incentives to attract entrepreneurs and investors as well. The State Duma has passed legislation providing a 10-year tax holiday for enterprises in Skolkovo, and the Kremlin has promised a separate legal framework and decreased levels of bureaucracy for companies operating there.

But the Skolkovo project is not without its skeptics, who point to the difficulty of implementing a top-down approach to innovation.

"When people try to recreate something forcefully, it does not really work. I think the key to the thing would be how much freedom will the individual [or] the entrepreneur have to found a company, based on his own idea and get funding to carry his own idea through," said Klaus Komenda, a Silicon Valley-based web developer at Yahoo. “If Russia can work out a model that enables that, then this can work, I think.”

While the state has promised billions of dollars worth of tax breaks, infrastructure projects and other types of funding for the innovation city, much will depend on the availability of venture capital.

"One of the key things to Silicon Valley, I think, was the fact that starting a company in the United States is very easy in terms of admin effort,” Komenda said. “Silicon Valley not only houses tech firms, but also venture capitalists, which are crucial to funding these companies.”

In June, Almaz Capital Partners announced that it would invest 900 billion rubles ($30 million) into a business incubator in Skolkovo. The state will have a 50 percent stake in the venture, while the rest will be owned by a seed fund comprised of Almaz Capital and a number of other investors.

"We plan to start with about 30 companies and end up with about eight viable IT startups," Alexander Galitsky, co-founder of Almaz Capital Partners, told The Moscow Times.

"The business incubator will focus on research and development, which is something that Skolkovo should encourage if it wants to be successful," Galitsky said.

From Flops to Petaflops

But Skolkovo is not the only weapon in the government's modernization arsenal. As a whole, the modernization agenda is a diverse set of programs, created and implemented by different arms of the government, directing state funds to a wide range of projects and enterprises.

The presidential commission on modernization, created in part to fast-track government funding to key projects in the modernization of the economy, has six priority projects: the development of supercomputers to aid in the modeling of complex systems; an "electronic government," where most state services would be offered electronically; an e-learning system, allowing for online training and professional education; online health care systems, providing for monitoring and analysis of citizens' health care needs; high-tech security systems, such as speech-identification, biometrics and video surveillance; and supercomputer education, providing a national system for training highly qualified personnel in supercomputer technologies.

The Communications and Press Ministry is developing a program that partly overlaps with that of the presidential commission. Its 10-year "Information Society" program oversees the development of a host of state-centered high-tech projects. The program oversees many of the e-government projects, and provides for a number of other programs, including the creation of a state e-mail system; a national search engine to compete on a global level; and a national operating system that government agencies and state-owned companies would have the option of using on their systems.

But much of the state cash being diverted to projects in the name of the modernization agenda may be going toward dubious ends. Projects to create a "next generation" antivirus and a 3-D animation system are both getting funding from state-owned VTB's venture capital fund, according to Russian Newsweek. But experts have said both projects are based on already-existing technologies and offer nothing new to the IT industry.

One project that Medvedev has taken a personal interest in is developing Russia's portfolio of supercomputers. At a Security Council meeting a year ago, Medvedev taunted government officials for their lack of IT savvy — and their ignorance of supercomputers in particular.

"Many entrepreneurs, let alone government agency representatives, know what supercomputers are, but to them, they are something exotic, like those machines that were being created in the '20s to catch up with and outdo America," he said.

With 47 supercomputer centers, and 11 computers on the list of the world's 500 most powerful, Russia ranks 12th among countries with the most powerful supercomputers.

"Our country will obviously be investing money into producing supercomputers," Medvedev said. "We have no choice here if we want to develop progressively."

The government has allocated 2.5 billion rubles to create the first Russian supercomputer that can perform a quadrillion operations a second, or a "petaflop," by 2011. But that will still lag behind the record, set by a U.S. supercomputer, of 1.75 petaflops.

Propaganda Needed

Ultimately, whether or not any of these short-term projects are successful, changing the face of the IT sector will require years of investing in human capital and, specifically, generating more interest among young people in the sector.

"We need more propaganda of IT in Russia," said Natalya Kasperskaya, chairwoman at computer security firm Kasperksy Labs.

"IT propaganda" should become part and parcel of the Russian school system, as early as elementary school, she said.

"We need more Chatroulette kids, not more lawyers or economists," Kasperskaya said.

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