

# Industry and Science After the Cold War

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Why are we, and many others in similar meetings, just now beginning serious discussions of “what’s next?” Is it the lingering recession? The elusive new world order? The Clinton political agenda? Or is it society’s waning interest in sophisticated nuclear weapons? The massive Cold War cleanup job to be faced? Foreign professional and industrial and scientific competition from the former Soviet Union? Dangerous proliferation, and export policy confusion? Each of you could add to this list of reasons.

## Industry After the Cold War

As business people, scientists, and engineers, it is in our nature to identify and analyze the problems we encounter, and to take steps to solve them, using our experience, skills and abilities. Then, possibly, it is in our nature to procrastinate while planning experts develop and analyze scenarios. It is both a useful reflection and a sobering process to remind ourselves of the training environment in which we learned our problem-solving skills and acquired the intuitive senses that guide our approaches; and where we learned the acceptable boundary conditions that constrained “practical” solutions. The great training ground where all of us have spent our professional careers was the Cold War. Because of the thorough conditioning we have all received, it may be somewhat harder to chart our collective courses in the absence of this great guiding environment.

Many find this easier to perceive when looking over the now-crumpled Iron Curtain. We intuitively appreciate the difficulty Russian factories have in adopting market economics, and the problems for the

weak Russian government in subsidizing these factories to avoid layoffs and social unrest. Their initial response is to urge deferral of changes, continuance of subsidies, restriction of imports, restructuring of ministries, and other stop-gap measures to buy time. They must buy time to find capital to modernize and develop industrial or civilian product lines or services, retrain managers and workers, develop needed business infrastructures, and learn marketing skills. But, just like us, they are victims of Cold War training. Even though they know that they face difficult tasks, and that many endeavors will ultimately fail, they come from a heritage and a culture of growing military needs and growing enterprises. It is thus not surprising that they rarely consider the option of downsizing or closing parts of the system. For some, possibly for many, it will nevertheless come to that, as it belatedly came to General Motors, Pan American and IBM.

There are bright spots in this picture, which I will discuss later in more detail. They include the Russian factory equivalent of automobile “parting out,” where entrepreneurial teams start up in corners of factories, renting tools and facilities—the so-called incubation centers.

Not surprisingly, Russians do look westerly, where they observe inefficiencies and patterns that they find hard to understand how we continue to tolerate. They see an addiction to regulatory behavior—specs, contracts, procedures—, the perception of a continuing need for a large nuclear infrastructure, and a continuing expectation of high defense expenditure levels. The American point of view that we have much to teach and little to learn may be somewhat naive. Russia may have now gone through much of the early optimistic phase following the Cold War, and, as they say in Olde England, is about suited up for battle, having reached, or nearly reached, a realistic understanding of the difficulties to be overcome. Where are we now?

## Science Before and After the Cold War

Of the international activities that sustained a degree of normalcy across the Iron Curtain during the Cold War decades, two that stand out are cultural activities (music, ballet) and science, especially space, geological and Antarctic science. While these areas were regularly handicapped by infringement into potential military relevance, a surprising number of East-West university and research laboratory collaborations flourished, with exchanges of scientists, data and research equipment. Unlike the case for the business picture, there is something to build on here, and, more important, a world resource to draw on that is only today beginning to be appreciated.

Under the Soviet Academy of Sciences, a team of some 20 million or so scientists and their associated technical specialists addressed an extensive array of scientific pursuits, funded primarily (70 percent) in support of potential military needs. As we all know, there are very few areas of science that cannot be justified as having potential military relevance; witness recent concerns about rogue designer viruses as a potential future weapon of mass destruction in the wake of AIDS research. With the breakup of the Soviet empire and the former Soviet Academy of Sciences into separate national entities, Russia retained the majority of the laboratories and scientists, but to date an estimated 30 percent of the pre-1990 staff has left, mostly to nonscience jobs for economic betterment. But since the Coup, even this remnant, in the view of politicians, is more of a burden than a benefit. The Russian Academy laboratories, numbering over 5000, cannot compete with the clout of the military industries. (Sound familiar?) Further, it is widely reported that much of the top talent has already left, considerably diminishing the remaining laboratories' capabilities.

So far most of the political attention has been paid to the military-industrial infrastructure, because of near-term needs for economic recovery. As I have mentioned, there are numerous plans for assistance, conversion, privatization, subsidies, trade assistance, and so forth. This

makes considerable sense, as in the Soviet era the military industries commanded the best and most modern facilities, which incidentally compared favorably with western weapons systems through the mid-1980s. In contrast, in Russia, the newly reorganized laboratories of the—now—Russian Academy of Sciences are faring rather badly, with effective budgets, considering inflation, about 10 percent of those of 1990.

### **Business and Science**

It is not just documentation of the situation in Russian science that I want to present, but the opportunity for U.S. businesses to participate in a historic change in trade relationships that could lead the U.S. out of the current recession and into future decades of prosperity. At this meeting, we have already heard of the numerous transitions of technology from national scientific laboratories to industrial applications, and a few to consumer products and services. I repeat, a few to consumer applications. Let's call this Lesson One.

Lesson Two, from what we have heard, could be converting pre-owned military systems (high-tech war surplus) to civilian or scientific uses. Oceanographic research using SOSUS, the high-sensitivity submarine detection system and low-cost, \$1000-per-pound satellite launches, using converted START surplus ICBMs, are examples.

Lesson Three could be joint partnerships to search the ex-Soviet Republics' science laboratories for talent and capability and developed technologies to improve a company's products and market performance. Apple's Newton is a current example; it uses the Russian company Paridigm's handwriting analysis algorithm.

I conclude with some observations that I believe we would ignore at some peril for both companies and national laboratories. First, nearly one third of the world's scientists have been effectively walled off from the scientist marketplace. The laws of supply and demand cannot be

forestalled indefinitely, and the above-market prices for U.S. scientists probably cannot be sustained much longer. Recall what has happened to airline pilots' salaries and housing prices. Get familiar with the ex-Soviet science laboratories in your areas of expertise or business. If you don't, expect that your competitors will.

Second, the global economy and global infosystems now require global thinking and international cooperation, not merely coordination, as in the past when protectionist forces would shelter old-style behavior. NASA's bureaucratic reluctance to draw on developed world capabilities, especially Russian boosters and MIR components, may shortly cost them the Space Station and the Shuttle. Personally, I would turn the space program over to the old SDI organization.

Third, become a vocal force, personally active in the international opening and exchanging of the vast wealth of scientific information bought by taxpayers or suffered by comrades during the Cold War. The difficulties of tapping this potential are daunting, with legions of self-appointed Cold Warriors waiting to thwart the normalization of international science and commerce, besides legitimate concerns about weapons proliferation. These actions will elicit cries of "disloyal," "unpatriotic," even "unfair" from protectionist and far-right camps. Nevertheless, our future security will depend increasingly on being economically strong, and on Russia's near-term economic stabilization. It makes sense for our economies to work together, especially when it comes to peaceful applications of nuclear capabilities, as we observe that maintaining an adequate deterrent force for our legitimate security needs is moving farther down the nation's list of priorities every day. ❖