

UC San Diego

SITC Research Briefs

Title

China's Defense Technology and Industrial Base in a Regional Context

Permalink

<https://escholarship.org/uc/item/8tp8k5kx>

Journal

SITC Policy Briefs, 2010(Policy Brief 12)

Author

Bitzinger, Richard A

Publication Date

2010-09-01



Policy Brief No. 12

September 2010

China's Defense Technology and Industrial Base in a Regional Context

Richard A. Bitzinger

Summary

While many countries in the Asia-Pacific region have extensive local arms industries, in terms of technology innovation these regional producers continue to run a poor third to the United States and Western Europe. Latecomer China may gain the advantage regionally, but it remains to be seen whether its accelerated spending, especially in R&D, will enable it to pull ahead of regional or global competitors.

The Study of Innovation and Technology in China (SITC) is a project of the University of California Institute on Global Conflict and Cooperation. SITC Policy Briefs provide analysis and recommendations based on the work of project participants. This material is based upon work supported by, or in part by, the U.S. Army Research Laboratory and the U.S. Army Research Office through the Minerva Initiative under grant #W911NF-09-1-0081. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Army Research Laboratory and the U.S. Army Research Office.

Many countries in the Asia-Pacific region have created extensive, even quite impressive, local arms industries. In some cases, these nations are moving toward the point where they are capable of producing arms that approach the state-of-the-art in particular industrial sectors. For example, South Korea manufactures the impressive T-50 advanced trainer jet, and its K21 IFV and XK-2 tank are likely as capable as any comparable systems produced in the West. Singapore produces some excellent artillery systems, and it has successfully exported its small arms and armored vehicles. India's Tejas fighter is impressive in its extensive use of carbon fiber composites (CFCs), which make up 45 percent of the plane's airframe by weight, including the fuselage, wing, elevons, and vertical stabilizer. Not surprisingly, Japan, as an advanced industrial nation, manufactures very advanced weapons systems, particularly in the area of submarines, fighter aircraft, main battle tanks, and, increasingly, missile systems.

And yet armaments production in the Asia-Pacific region, in terms of technology innovation, continues to run a poor third to the United States and Western Europe (and perhaps, in certain sectors, even Israel). Overall, most defense industries in the region are still primarily "metal-bashers" as opposed to innovators.

LIMITATIONS

There are several limitations impeding technological innovation in the region's defense industries. First, regional armed forces are still heavily platform-centric, as opposed to network-centric, and this is reflected in their defense industries. Most weapons systems produced in the Asia-Pacific region, while good, are still rather prosaic and "industrial-age": tanks, artillery pieces, surface combatants, combat aircraft, and the like. To be sure, the Asian-Pacific arms industry has produced a few interesting, even cutting-edge military systems—South Korea has developed its own antiship and land-attack cruise missiles, for example, and Japan has launched its own surveillance satellites—but local defense industrial bases are particularly lacking when it comes to network-centric-type matériel, such as radar and other sensors, seekers, and electronic warfare systems.

The heavy emphasis in most of these countries on self-reliance (autarky) in arms production means that resources are often wasted on replicating the development and manufacture of weapons systems already widely available on the global arms market. In terms of capabilities, many local pieces of military equipment simply duplicate military systems that have been in production in the West for twenty years or more. Additionally, locally produced armaments are frequently acquired not for their capabilities, but for economic reasons, that is, to provide jobs and to keep factories operating. Consequently, local arms manufacturers tend to push their governments to buy those systems that they are already capable of producing. These "legacy systems" only compound the problem of platform centrality.

As a corollary, most regional defense industrial bases—even in Japan—lack the necessary design skills and technological expertise in order to truly innovate. In particular, these countries' defense industries in general do not possess sufficiently advanced systems integration capabilities to link together highly complex systems-of-systems, such as C4ISR networks. Most of these firms are not set up to function as "lead systems integrators"—such as a Lockheed Martin or a BAE Systems—capable of building and leading large teams of disparate subcontractors to design, develop, and manufacture a system to customer specifications.

Moreover, defense industries in the Asia-Pacific region have few strong linkages to innovative local industries such as the IT sector, limiting the potential for commercial-to-military spin-on. In particular, state-owned arms industries such as India's are generally segregated from both market forces and the private sector, but even in countries where armaments manufacturing is embedded in private industry, such as Japan and South Korea, actual military-related production is still often isolated in their "defense-industry ghettos": factories, assembly lines, and shipyards that are kept separate from civilian production. Consequently, there is often little cross-fertilization with commercial technologies making it harder and providing fewer incentives for civilian industries to participate in military R&D and manufacturing.

Armaments production in the Asia-Pacific region is a decidedly inefficient affair. The relatively small-scale arms manufacturing of the type generally found in the region is rarely cost effective. Yet overall there appears to be little inclination among the region's leading armaments producers to rationalize their defense sectors by abandoning overly ambitious weapons programs, closing down unsustainable production lines, and laying off unneeded workers. If anything, the commitment to preserving—and in some cases, even expanding—local defense industrial bases has never been stronger. Despite technological hurdles and high entry costs, “techno-nationalism” continues to be a very powerful force acting on most Asia-Pacific arms-producing states. Consequently, armaments production in the region is often exemplified by wasteful “prestige projects” that cost more than systems found on the international arms market and yet do not deliver more in terms of capabilities.

Finally, these local arms industries' problems are compounded by the presence of small, financially strapped defense R&D bases. Quite simply, local R&D infrastructures are not big enough, nor are they adequately funded enough, to make sufficient advancements in defense-related areas. Regional defense R&D budgets average no more than US\$1.5 billion a year and in some cases, much less, although Japan's defense R&D spending may be higher, due to private industry contributions. Certainly, local defense technology bases in the Asia-Pacific are nowhere near as lavishly funded as in the United States, which spent US\$78 billion on defense R&D in FY2010, including billions for basic research. For example, the Defense Advanced Research Projects Agency alone has an annual budget of approximately US\$3 billion. A lot of so-called defense R&D in the Asia-Pacific region, therefore, is basically applied research—developing and prototyping weapons systems, rather than engaging in truly innovative basic research.

REGIONAL CAPABILITIES

In the final analysis, most Asia-Pacific armaments producers will remain—relative to the United States and Western Europe—secondary or even

tertiary actors in the international arms business, manufacturing military equipment mainly for domestic consumption or occupying a few highly specialized niches in the global defense industrial food chain.

Japan's defense industry currently suffers from two decades of funding neglect, and Tokyo is already finding it increasingly difficult to maintain its traditional level of *kokusanka*/autarky.

For its part, South Korea may be a perfect example of “technology overreach” in its indigenous arms industry, as earlier success with local arms production has bred greater ambitions, which in turn might spur it to pursue programs that lay beyond its economic or technological capacities.

Singapore's defense industry has thrived mostly on much lower expectations (i.e., niche work), but again, its strengths have traditionally rested in industrial-age products like small arms, artillery systems, and light armored vehicles, although its current efforts at crafting a “Singaporean RMA” via its IKC2 command and control program could bear interesting fruit some day.

India is a particularly disheartening case study. After China, India possesses the largest and most ambitious defense industrial base in the Asia-Pacific region, and yet its performance over the past 50 years has been disappointing in the very least. Billions of dollars have been squandered on domestic weapons programs that have never performed up to their requirements or met their objectives when it came to costs and timetables. The local arms industry is a white elephant of highly protected, monopolistic, state-owned corporations, headed by a bloated government-run defense R&D establishment, which presses for indigenous solutions with little heed to capabilities and timeliness. Despite repeated attempts at reform, the Indian defense industrial base has eluded any real progress when it comes to restructuring.

THE CHINESE CASE

With regard to China, its defense industrial base could, in large part, be viewed as catching up to the rest of the Asian-Pacific arms industries simply by the virtue of not standing still.

Admittedly, the Chinese defense industry was, fifteen years ago, at a much lower level of tech-

nology, quality, and capability, but it also had the latecomer's advantage in drawing nearer to the standard of the overall regional arms industries, as other countries' defense technology and industrial bases have expanded at a much slower rate.

In terms of emerging systems, Chinese military hardware is probably as good as most found coming out of the arms factories of Japan, South Korea, India, or Singapore, although it should be pointed out that the overall quality of the People's Liberation Army (PLA) is dragged down by large amounts of obsolete systems in its arsenal that are yet to be replaced. In large part, this is the result of nearly 15 years of double-digit growth in the official Chinese defense budget, which has increased dramatically since the late 1990s. The PLA's equipment budget in particular has risen from US\$3.1 billion in 1997 to an estimated US\$26 billion in 2010; of this, perhaps US\$4 billion to US\$6 billion is dedicated to defense R&D, putting it far ahead of any other country in the region and perhaps even making it the second-highest spender globally.

In the future, the challenges facing the Chinese defense technological and industrial base may be similar to those facing the other regional arms industries: that is, moving from a basically platform-centric to an increasingly network-centric technological-industrial process. Asian-Pacific arms industries have been most successful in replicating production of "technologically mature" types of military equipment: tanks and armored vehicles, warships, submarines, ballistic missiles, and the like, and even then, the definition of "success" is often highly debatable. Moving beyond

metal-bashing industrial-age weapons production to more network-centric solutions is a capital- and technology-intensive process requiring significant investments in R&D. It is increasingly uncertain whether most Asia-Pacific arms industries have the capacities to move to this next level.

RECOMMENDATIONS

1. To become innovators, defense industries in the Asia-Pacific region will need to move away from platform-centric to network-centric systems.
2. Significant investments in R&D and advanced systems integration capabilities will be needed to move the region's defense-industrial base forward, as well as stronger links to civilian industries in order to tap into innovative commercial technologies.
3. Ultimately, self-reliance in arms production may no longer be the best model. Countries should consider partnering with Western defense firms in order to develop and manufacture next-generation weapons systems.

Richard A. BITZINGER is a senior fellow with the Military Transformations Program at the S.Rajaratnam School of International Studies, where his work focuses on military and defense issues relating to the Asia-Pacific region, including force modernization and defense transformation, regional local defense industries and armaments production, and weapons proliferation. He is also the editor of *The Modern Defence Industry: Political, Economic and Technological Issues* (Praeger, 2009).